122609

ARROW TRUCKING COMPANY

FLATBED, VAN & SPECIALIZED CARRIER
USA & CANADA

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Training Department
Driver Services Facility
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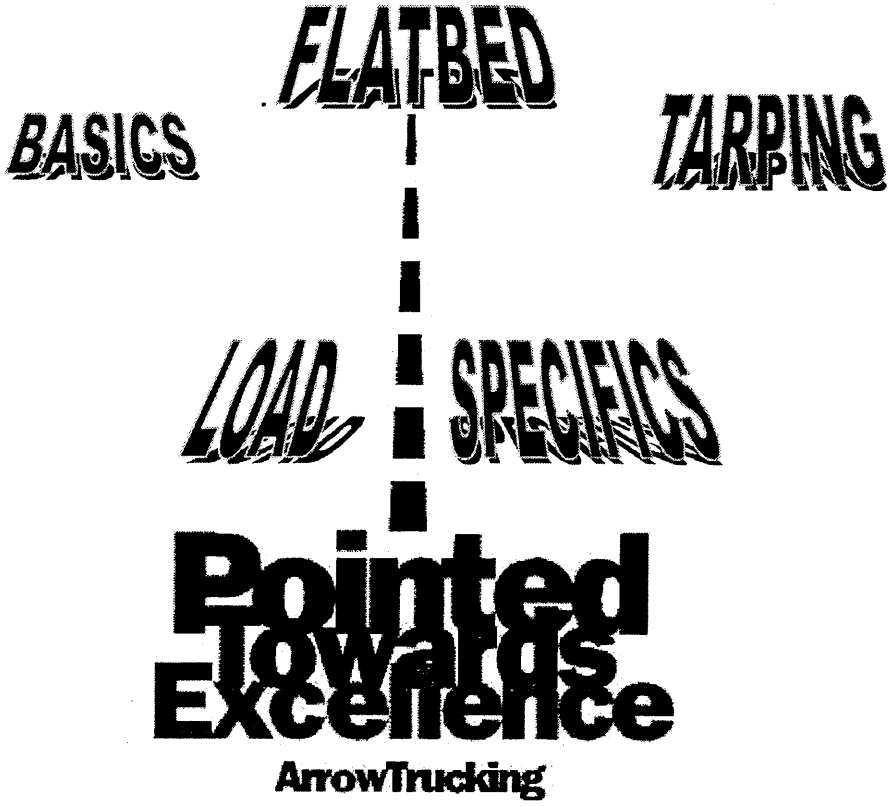
U.S. Department of Transportation
Dockets Management Facility
Room PL-401
400 Seventh Street, SW
Washington, DC 20590-0001
Docket No. FMCSA-97-2289 - 38

Dear Sirs,
We are currently reviewing the proposed rules for the Development of a North American Standard for Protection Against Shifting and Falling Cargo from the Federal Register. Having developed company load securement procedures based upon analysis of accidents over the last twelve years where cargo *stays on the trailer*, we wished to submit for your consideration Arrow's load securement packets for both our Van and Flatbed divisions.

Please note that these securement techniques are based upon the *steel framed trailers* we operate, not the less structurally durable aluminum framed trailers prevalent in the industry.

It is suggested that when developing securement regulations consideration be given to the type of trailer (ie: steel vs. aluminum) in use when determining securement techniques.

LOAD SECUREMENT 2000+



Safety is Everyone's Business!!

Receipt

I hereby acknowledge the receipt of the Arrow Trucking Co. Flatbed Load Securement packet on

_____

Month Day Year

I further acknowledge that I will read this packet, and that I am required to use this guide when securing loads for the Flatbed Division.

_____

Signature

_____

Print Name

_____

Date

!!!ALERT!!!

ONLY YOU, THE DRIVER, CAN CONTROL CARGO LOSSES!!

Where to find what you need:

INTRODUCTION

There are a lot of "little details" to load securement. While this manual cannot address every contingency and every load, we can identify the basic elements of flatbed load securement that can be applied in all circumstances.

There are two words to keep in mind whenever doing load securement:

Balance
Leverage

If you have ever balanced a baseball bat in the palm of your hand you'll remember how you had to move your hand around to keep the bat standing upright. Imagine guidewires coming down from the bat to the palm of your hand on all sides helping to keep the load steady instead of having to move your hand around to keep it balanced. That's load securement! We use the chains and straps to keep the load *balanced* on the "palm" of the trailer front to back and side to side.

To snug down the chains and straps and keep ourselves safe from injury while we do so, we need to maintain our *balance* to keep from getting pulled one way or the other and we need to use *leverage* on the winch bar to tighten the binders and winches rather than brute strength.

Many of our cargo claims stem from two types of driving accidents, in one of these the first sentence of the accident report reads: *I had to hit my brakes hard.* In these cases the cargo invariably shifts forward (guess where you sit). In the other, the driver usually enters a maneuver *too fast. Your load securement has to take into account extreme driving reactions.*

But before we can start talking intelligently about load securement we need to do three things: *Define our terms* so that we "speak the same language".
***Identify the basic components* of our equipment.**
***Provide a "framework"* to hang all the "little details" or tricks of the trade upon so that you can see the patterns these little details fit within, develop a measurement by which you can judge what other drivers tell you, and demonstrate the logic behind the techniques that we recommend.**

DEFINING OUR TERMS

The basic issue of securement equipment on an Arrow flatbed is:

- **12 chains**
- **12 binders**
- **12 straps**
- **12 winches**
- **tarps (either doubles or triples)**
- **4 pipe stakes**
- **4 coil racks**
- **dunnage (4x4's)**

Since this equipment is issued to you and you sign for it, always get a receipt for it if or when you have to turn it in.

Other equipment you will need:

- **a winch bar**
- **bungees**
- **padding**

Other equipment you may need or want to have:

- **v-boards**
- **corner boards**
- **coil protectors**
- **rope**
- **strap winder (optional)**
- **tools - see recommended tool list in Driver Manual**

DEFINITIONS

Chains: forged steel links steel approximately 20' to 24' long with hooks on both ends attached by pins.
Chains are the strongest tie down device. They may be used to tie down heavy loads like steel, machinery, and pipe. Chains should not be used on damageable loads. Like straps, rating of chains is by strength. Check chains for broken of bent links before use.

1. Never lock or release a load binder while standing on the load.
2. Locking will take the slack out of the chain. Chain binders should be positioned to let the driver pull down on the handle. This lets gravity aid in the closure.
3. For more leverage, slide a piece of pipe (cheater bar) over the handle of the winch bar. Slide the pipe on the handle so it cannot slip off.
4. Never place any part of the body in such a position that it can be struck by the handle as it rotates or flips from the locked to the released position or vice versa.
5. Keep feet firmly placed on the ground at all times.

Binders: a double hooked device with a leverage arm used to tighten chains.

Straps: 4 inch wide canvas lengths with a flat hook on one end.
Straps will be tightened by tensioning devices such as winches or ratchets. They are subject to cutting and chafing and must be inspected regularly. The rating of straps is by the amount of load they can hold, generally five hundred (500) to (10,000) pounds. Drivers must use the properly rated strap for the load

Winches: a cast metal unit designed to tighten straps

Winch (Cheater) bar: a metal bar used to gain leverage in tightening down binders on chains and straps on winches.

Cheater Pipe: a length of pipe used as an extension over a winch bar to enhance leverage

Bungees: rubber lengths with hooks through eyelet's on both ends.

Dunnage: wood used for blocking, bracing, separating, or supporting cargo

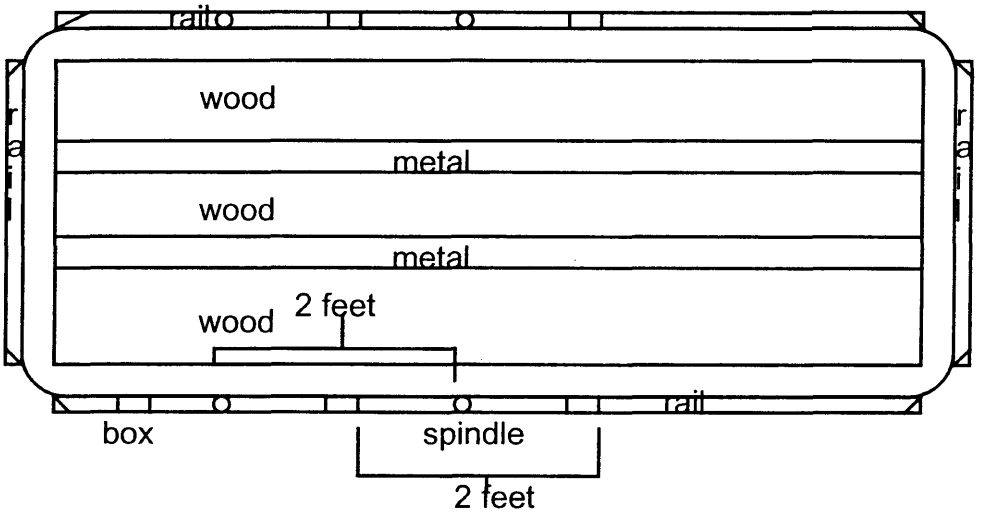
Padding: various materials (i.e.: cardboard, strips of old tires, old carpet remnants, etc.) used to protect cargo from securement devices and vice versa.

Edge Protectors:	**Use edge protectors to prevent chafing between the chains or straps, a piece of rubber between the strap and the sharp edge of the cargo will prevent the edge from cutting the strap. When using chains, a piece of rubber placed between the chain and the cargo it is holding down will prevent the chain from damaging the cargo. Carpet, inner tubes, tires, or even lumber may be used as edge protectors. V-Boards are also used to distribute strap pressure over a greater area instead of restricting it to a specific 4" spot. This helps prevents damaging cargo.**
V-boards:	**two boards connected by six inch lengths of strapping used to distribute the pull of a strap over a greater area.**
Corner boards:	**layered cardboard edge protectors used to protect cargo from damage when tightening down securement devices.**
Tarps:	**large rubberized sheets in folds used to cover loads to prevent damage to the load from the elements, including road film, grime, debris and the smoke from our stacks.**
Coil Racks:	**blocking devices used to hold dunnage in place to form a cradle for coils and support the weight of the coil. (Not recognized in California)**
Pipe Stakes:	**metal pipes inserted in the stake pockets (boxes) of the securement rail used in addition to normal securement devices to help contain cargo, preventing it from rolling or shifting off the trailer**

Identifying our equipment

The Securement Rail

The chains and straps are secured to the "Rub rail" of the trailer. The trailer rail (securement rail, rub rail) is a railing surrounding the deck frame of a flat bed trailer, the top of the rail is flush with the deck of the trailer. Your chains and/or straps are anchored to this rail. In the rail you will find alternating boxes (pipe stake pockets) and spindles (or spools) that are evenly spaced down the lengths of both sides of the trailer. Each stake pocket will be across from a stake pocket. Each spindle will be across from a spindle on the opposite side of the trailer. The spools and pipe stake pockets are evenly spaced 2 feet apart down the side of the trailer.

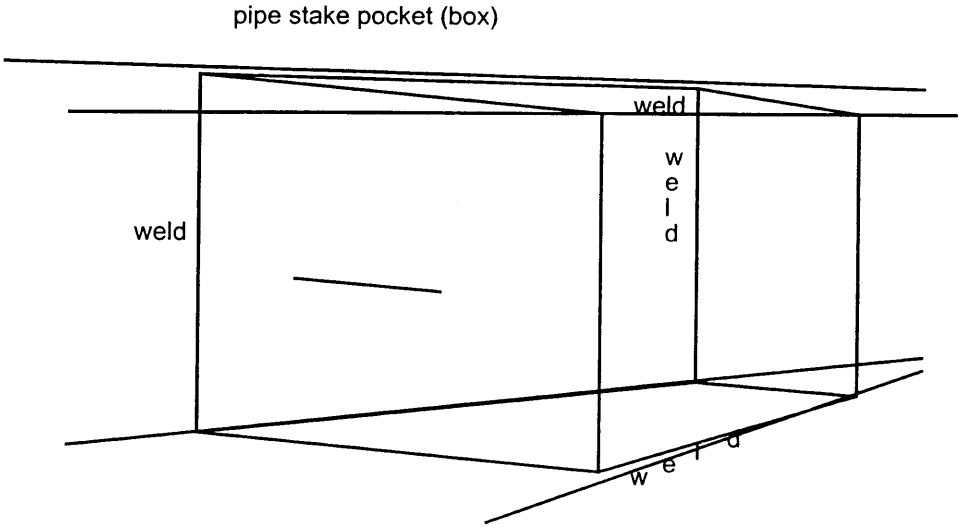


Spindles (spools) are short, thick metal spools that run between the side of the trailer deck frame and the rail. Used to wrap chains around and/or to control the direction of the pull of the chain.

Wood Floor of the Trailer

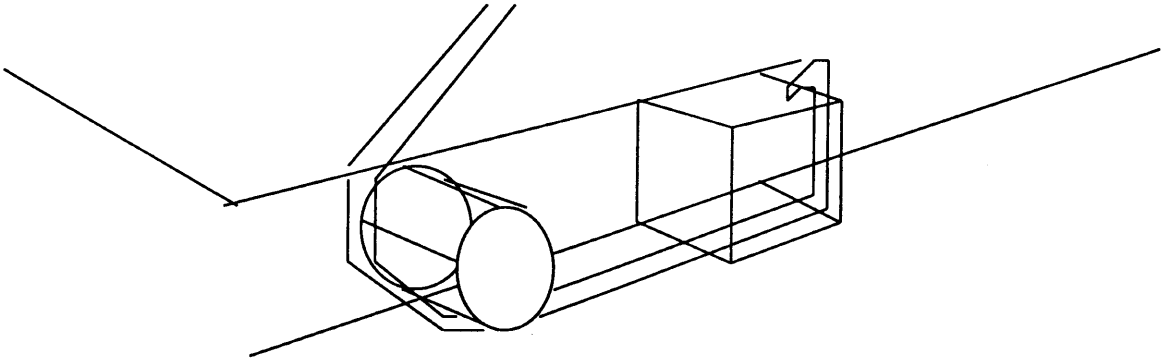
Box **SPINDLE** **Box** **SPINDLE** **Box**

Boxes (stake pockets) are actual metal boxes that run between the frame of the trailer deck and the rail. Used for securing the hook on a chain to.

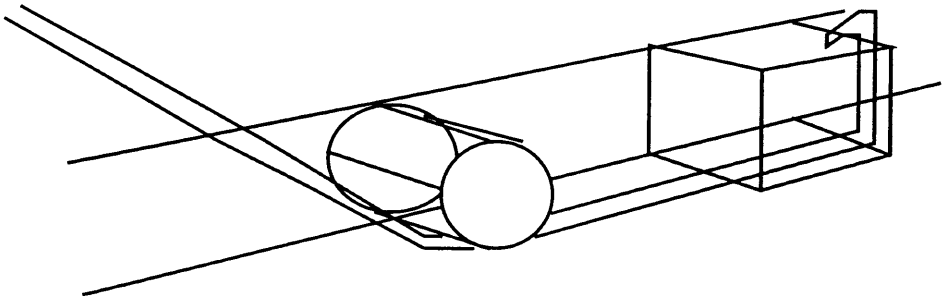


Chains

Every time you secure a chain, the chain should go around a spool (the strongest part of the rub rail) and secure to the outside of the box.

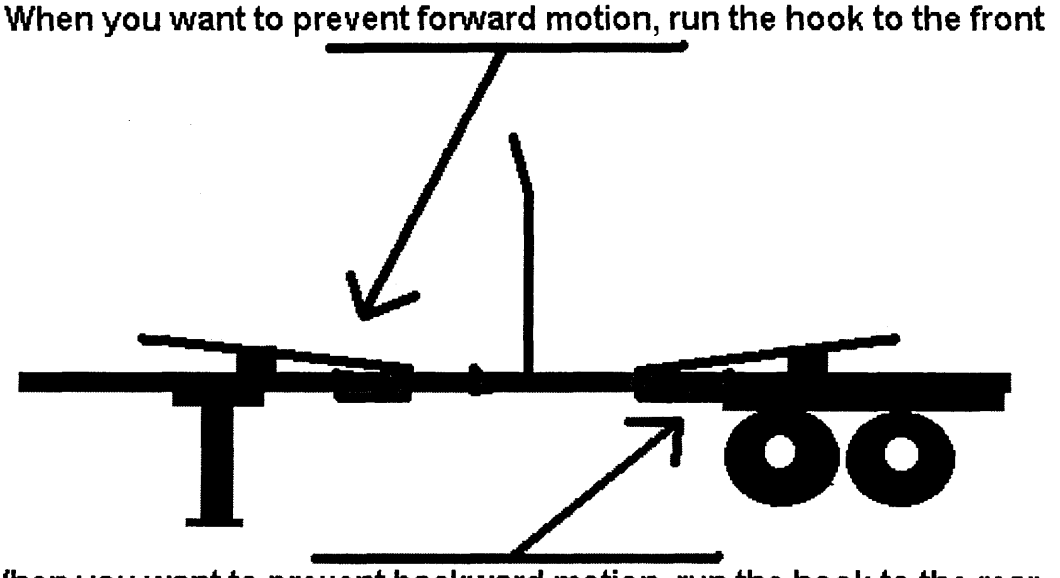


or



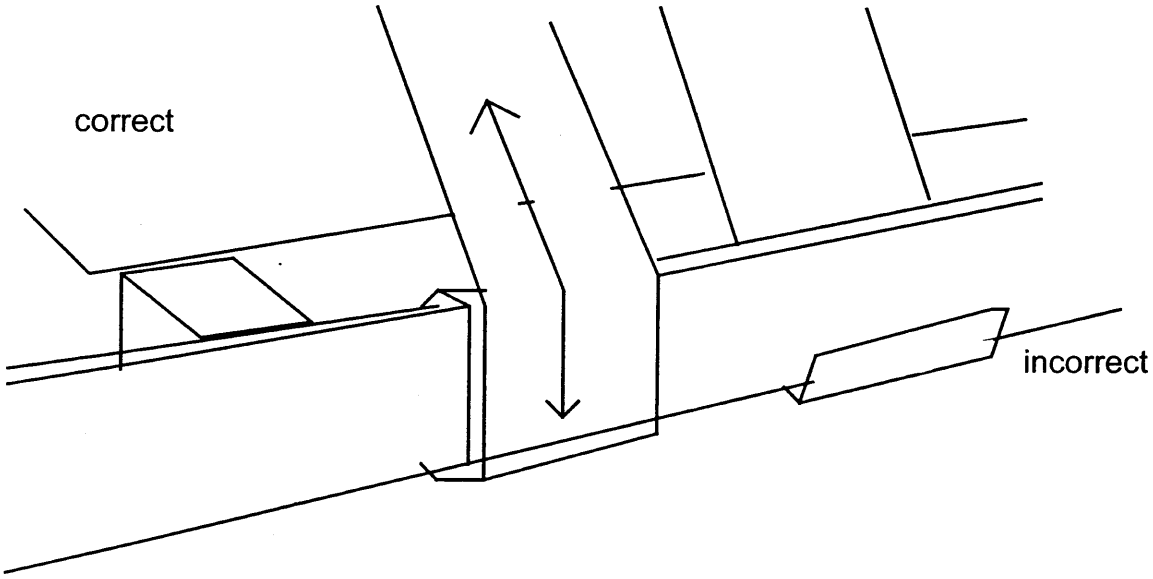
Running a chain around a spool and securing it to the outside of a box creates an even distribution of pull across the chain rather than concentrating it on one spot of the chain or hook. This method allows you to distribute the pull of the chain across 4 points (the spool, the 2 bottom edges of the box, and where the hook is secured to the top edge of the box). This method incorporates the strongest part of the rub rail (the spool) and all of the weakest part of the rail (the box).

Which direction you run the hook of the chain (to which box) can also matter. In the first figure above you can see that the chain is curved around the spool in a tight angle this would give you immediate braking action. In the second figure there is a wide open angle. If there is any slack in the chain this would allow movement of the cargo before jerking against the chain. The next figure illustrates a simple rule to follow when possible.

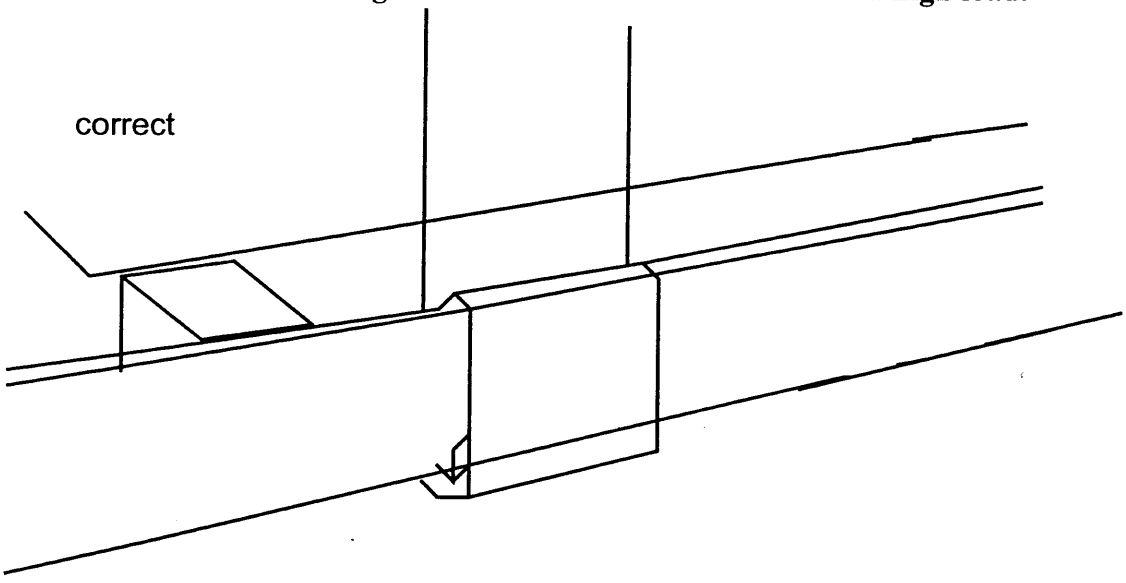


Watch for this rule on every load we discuss and when we discuss the 4 securement techniques.

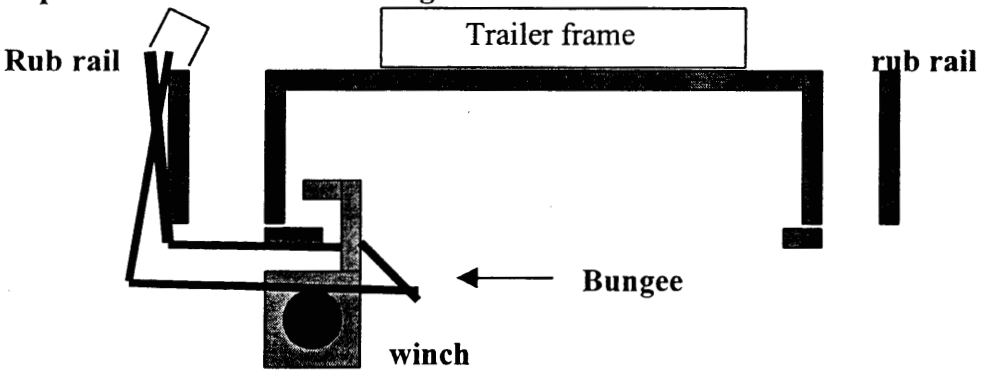
The straps are secured to the rub rail itself. The strap is wrapped around the hook of the strap (the metal portion of the strap) on the rub rail so that there is no direct pull on any one point of the strap and to prevent the strap from coming unhooked.

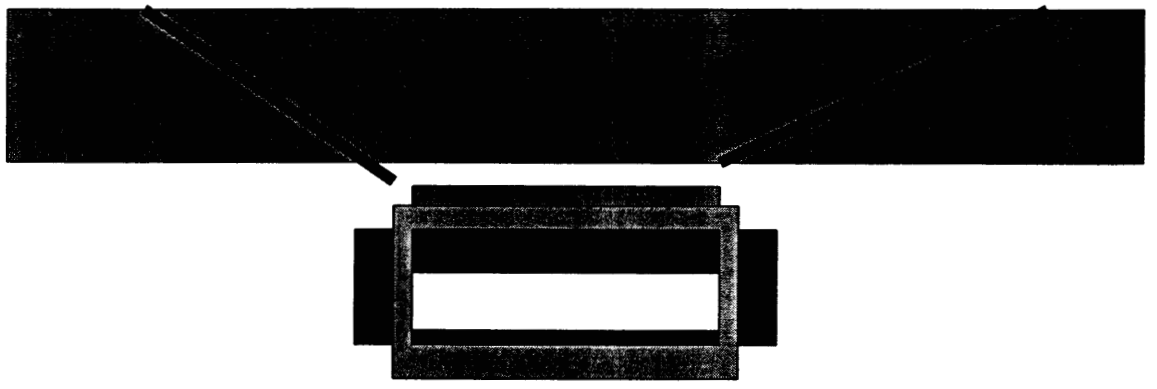


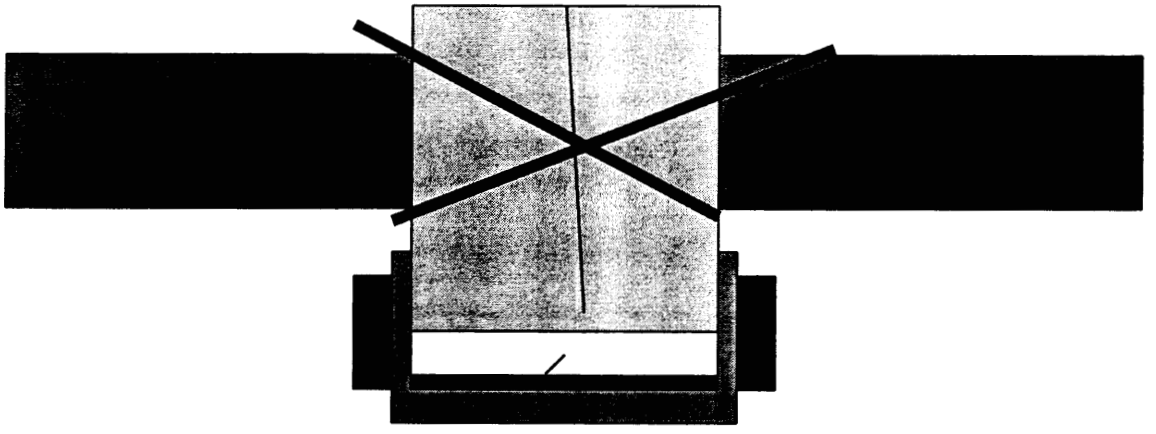
In the above figure, the correct strap would be good for a low load. The way the strap is run would keep the strap from rubbing against the sharp edge of the trailer deck. In the next figure the reverse is shown for use on a high load.



When securing a strap winch to the rub rail/frame of the trailer use a bungee to pull the back of the winch against the frame of the trailer:







Our Framework, The 7/4/3 Rule

Different types of loads have different requirements. However, all load securements have certain points in common. We call this the 7/4/3 rule.

There are:

7 points for evaluating a load	**4 techniques for securing it**	**3 ways to measure your securement**

****

7 points for evaluating every load:

Prioritize and limit the 4 types of movement

1. **up and down**
2. **back and forth**
3. **side to side**
4. **any toppling or fall over effect**
5. **start at the bottom and work up**
6. **protect the product**
7. **dress out the trailer**

4 securement techniques used in securing every load

1. **Direct Pull**
2. **Counter Balancing**
3. **Bellywrapping**
4. **Cross Chaining**

3 measurements that tell you whether or not you did a good job of securing the load

1. **How is every chain or strap secured to the rub rail.**
2. **Balance of pull from front to back**
3. **Balance of pull from side to side**

Pipe

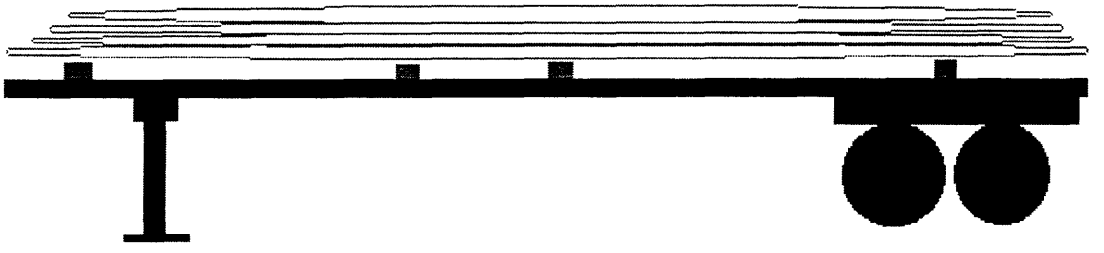
Let's look at several loads in terms of the 7 points for evaluating your load.

To *balance* the load on the trailer we have to *prioritize and limit potential movement.*

1. ***Up and down.***
2. ***Side to side.***
3. ***Front to back.***
4. ***And toppling or fall over.***

On a pipe load which way is the load most likely to move while the trailer is just sitting there at the loading point? _____. Which way Is it most likely to move once you start driving? _____. Then these are the directions of movement that we have to prioritize in terms of limiting them.

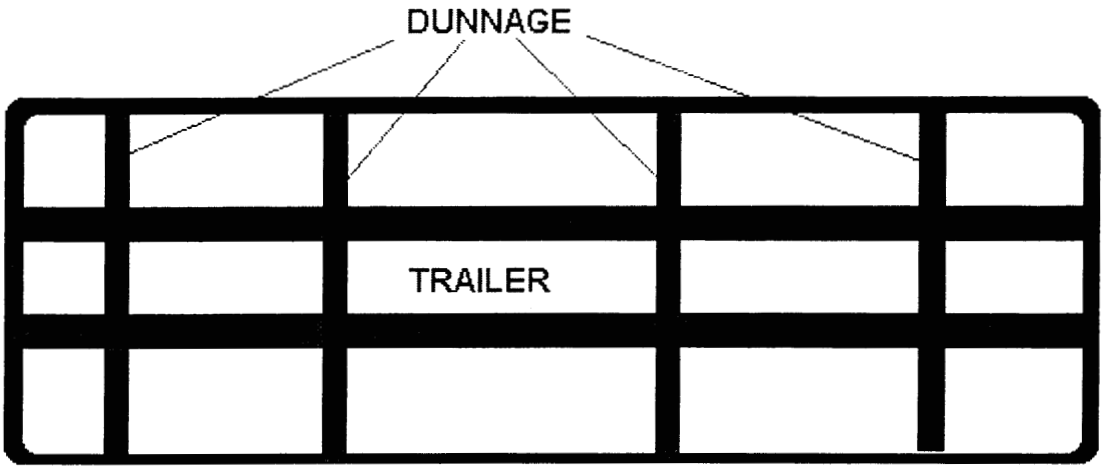
While at rest on the trailer the pipe is most likely to roll off the sides.



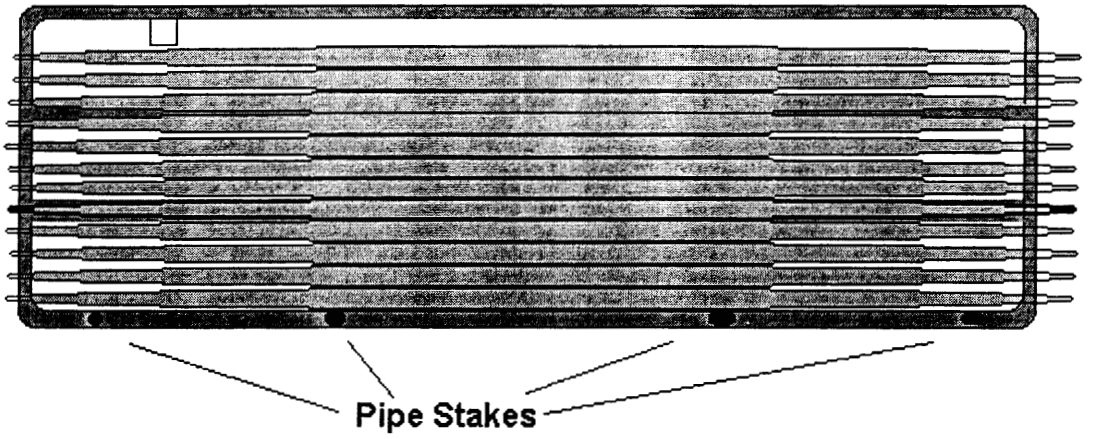
Once in motion the cargo is most likely to move back and forth.
So our securement has to address limiting these two potential movements. How do we start? With step 5.

5. Start at the bottom and work up. **This means intelligently using our dunnage to help support the load and center the load on the trailer.**

Before loading pipe lay out your dunnage (4x4's) to support the cargo and distribute the weight of the cargo on your trailer.

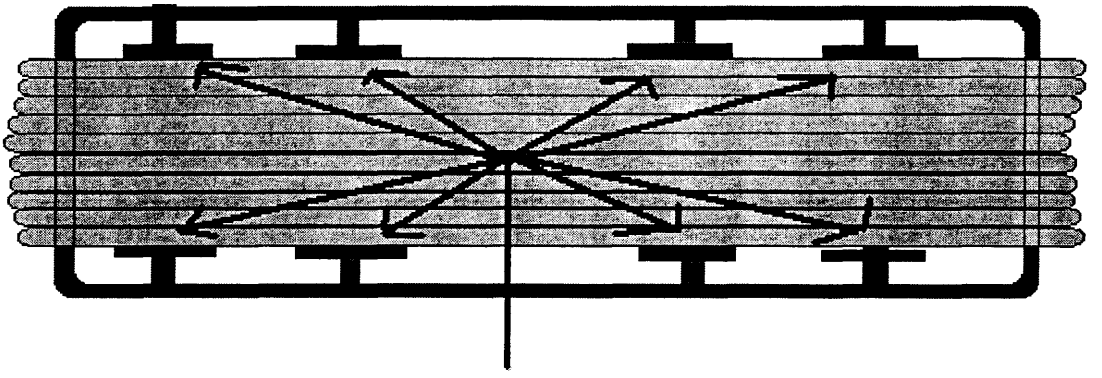


When pipe is being loaded you will have to put *pipe stakes* in the pipe stake pockets (boxes) of the rub rail to keep them from rolling off the opposite side. (see next figure)



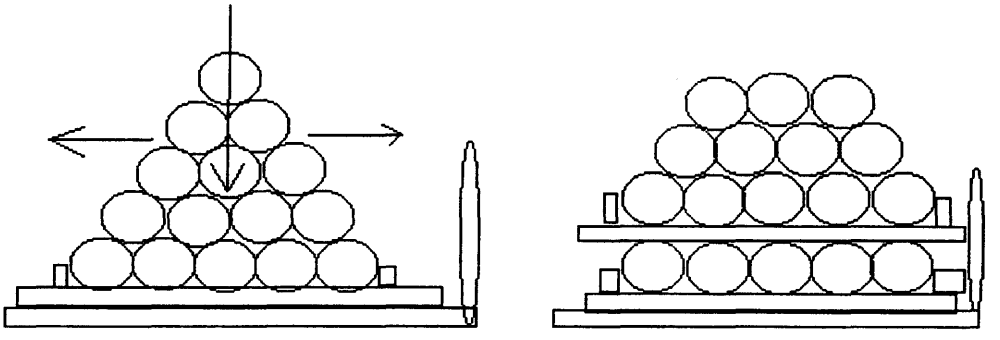
But this will not center your load. What you have to do is have the fork lift operator reposition the first layer of pipe once you see where it falls on the trailer. You will use additional dunnage to block the load and center it on the trailer. (see next figure).

CAUTION: Never stand on top of a load of pipe to do your securement. 1. Pipe can roll or shift while you are on it and easily crush a foot or ankle. 2. Never work in the middle of a pipe load without first securing the ends. If the pipe rolls off the trailer you will have no where to run. By securing the ends first, if the pipe rolls off you can step off the end of the pipe out of the way since you are on the ground.



Blocking

Now that we have centered the load on the trailer, additional layers of pipe may be added. Remember that on a pyramid load of pipe you will want to have a layer of at least two pipes. When we tighten down our securement a single pipe on top will be forced downward into the next layer down. This will cause the lower layers to spread apart. This can sometimes be accomplished by adding an additional layer of dunnage over the first layer of pipe. Secure that first layer and then continue the securement on the rest of the load.



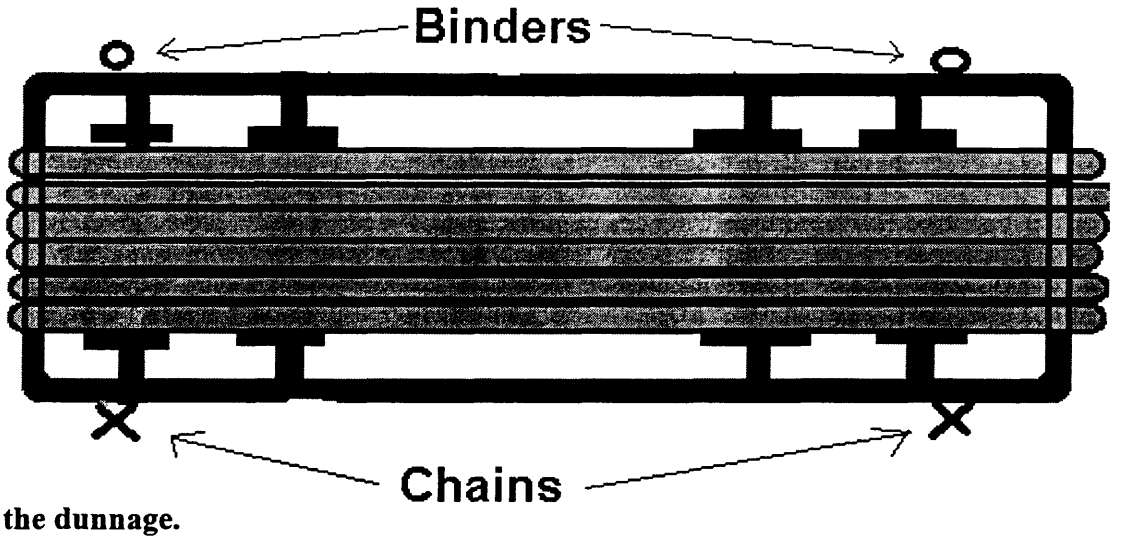
The next question we have to ask ourselves is point 6. Do we need to *Protect The Product?* In the case of this pipe we don't, but it will become important with different types of cargo.

Our 7th point is *Dressing Out The Trailer.* This means working smart, not hard. It means laying our all the equipment that we intend to use where we intend to use it. This way we can mentally develop a picture in our mind of what our securement is going to look like, what points is it structurally going to address.

We already said that we have to limit the side to side movement (for which we will use the securement technique called *Direct Pull*) and the forward and backward movement (for which we will use the securement technique called *Bellywrapping*). However, on a pipe load we want to secure the ends first to prevent the load from rolling off of the trailer before we can safely work in the middle of the load.

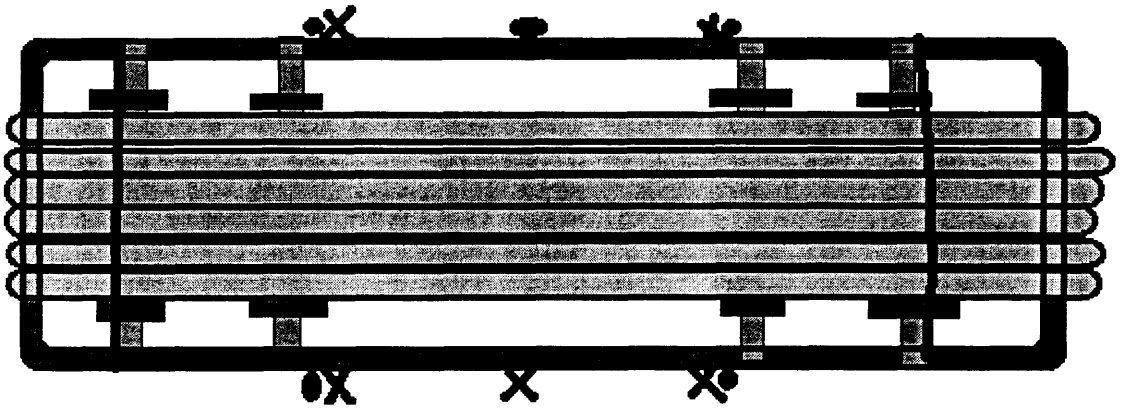
In the next figure the circles represent where the binders are going to go and the X's represent where the chains are going to be hung prior to securing them. On *Direct Pull* the chain goes on one side and the binder goes on the opposite side. For *Bellywrapping* you hang a chain and a binder together on both sides of the trailer.

Hang the chains and the binders for the *Direct Pull* on the spools closest to the dunnage. This way the chain will be pulling down where the cargo is supported by



the dunnage.
Once the ends are secured then we can dress out the rest of the trailer. We'll set up one more *Direct Pull* over the center of the load with a chain on one side and the binder on the other, then we'll dress out two *Bellywraps* on either side of the center chain evenly space between the end chains and the center chain.

Remember: While the *Direct Pull* started with a chain on one side and the binder on the opposite side, the *Bellywrap* dresses out by hanging a chain and a binder together on both sides of the trailer.



We have already mentioned two of the 4 securement techniques *Direct Pull* and *Bellywrapping*. Now we need to look at all four techniques. The four techniques break down into two categories for dressing out the trailer:

***Direct Pull and Counter Balancing* both dress out the same way with a chain on one side and a binder on the opposite side of the trailer.**

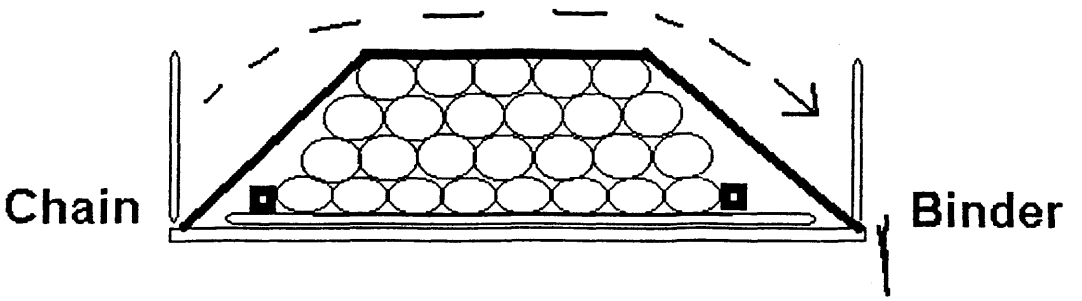
***Bellywrapping and Cross Chaining* both dress out another way which is placing a chain and binder together on the same spool on both sides of the trailer.**

Further, a *Direct Pull, a Counter Balance, and a Cross Chaining* all start by securing the chain to the rub rail and then throwing the chain across the cargo to the other side of the trailer. A *Bellywrap* starts differently. Instead of securing the chain to the trailer the chain is put on the trailer under the cargo and then both ends of the chain are thrown over the cargo. It is then secured to the trailer as the final step.

Confused? Let's look at them.

Direct Pull

***Direct Pull* is used to hold the cargo straight down to the dunnage and therefore to the trailer. It simply means going up and over the cargo and pulling straight down. It is accomplished by securing the chain to the rub rail as discussed above and throwing the chain over to a binder waiting to receive it.**



The other end of the chain is then secured to the rub rail in the same manner and the excess chain is then pulled to the outside of the rub rail where the binder is.

A chain will always slip(due to road vibration) to the most direct line between two points. Before binding down the chain, check that it is running in a straight line from one spool to the one directly opposite. If the chain has twists in it, then the chain needs to be turned so that there is a "V" groove running down the entire length of the links of chain otherwise these twists will roll out in transit and turn the handle of the binder down to the floor of the trailer.

Bellywrap

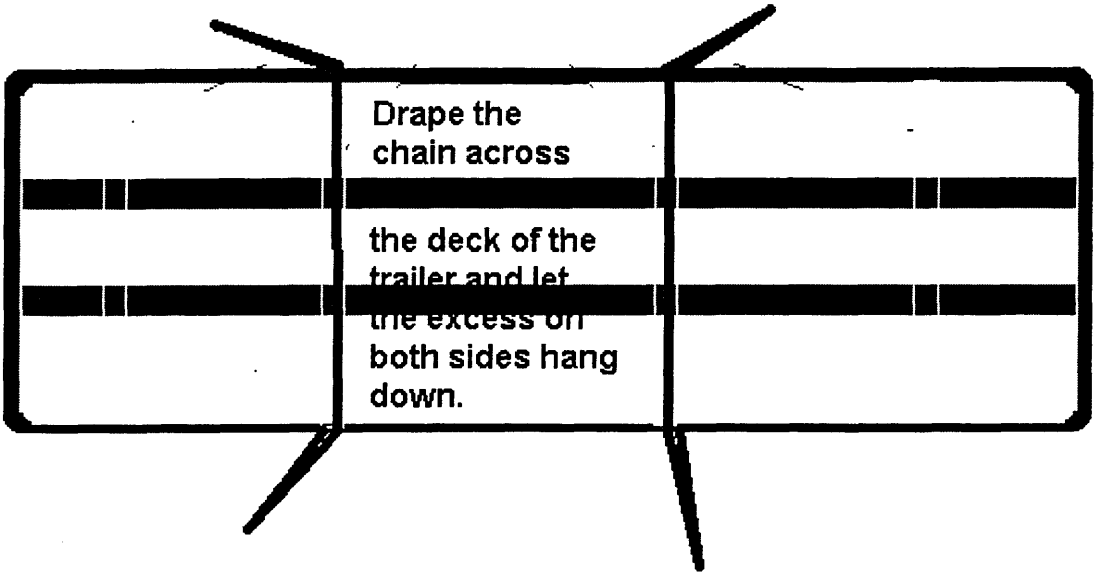
A *Bellywrap* is used to pull loose cargo into one unit and keep it from moving:

back and forth
or from toppling over
or from spreading apart

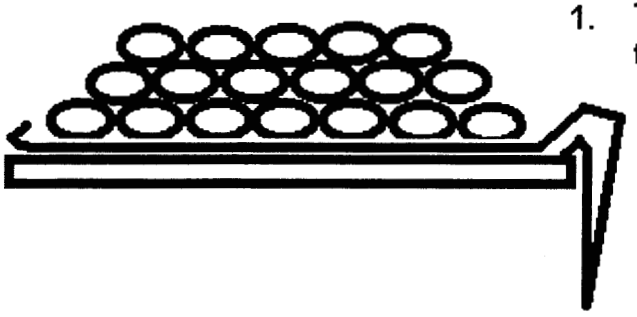
NOTE: It can be accomplished using one chain employing the technique below. It can also be accomplished with straps instead of chains. Here we'll show you the two chain method for larger pipe loads.

A *Bellywrap* has three steps in it.

1. DRAPE – lay the chain across the deck of the trailer and let the excess on both sides hang down.

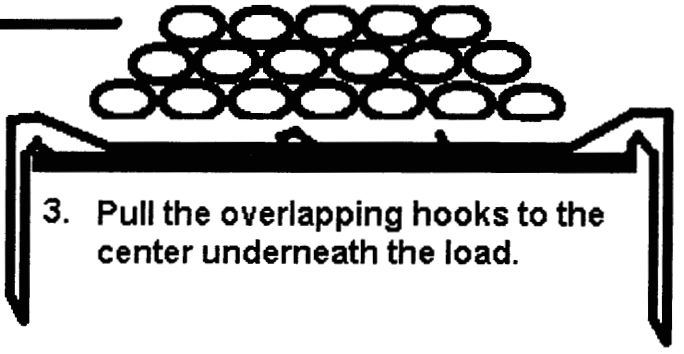


If the cargo has been preloaded, you still need to get the chain *under* the cargo and across the trailer deck. Once you have gotten one chain (20') under the cargo, grab the chain from the other side and hook the two chains together so that they make one continuous length (40'). Where you overlap the hooks/chains you can use duct tape or wire to hold them together. Then pull the overlapping hooks underneath the center of the load and keep them there throughout the rest of the operation.



1. Throw one hook/chain under the cargo.

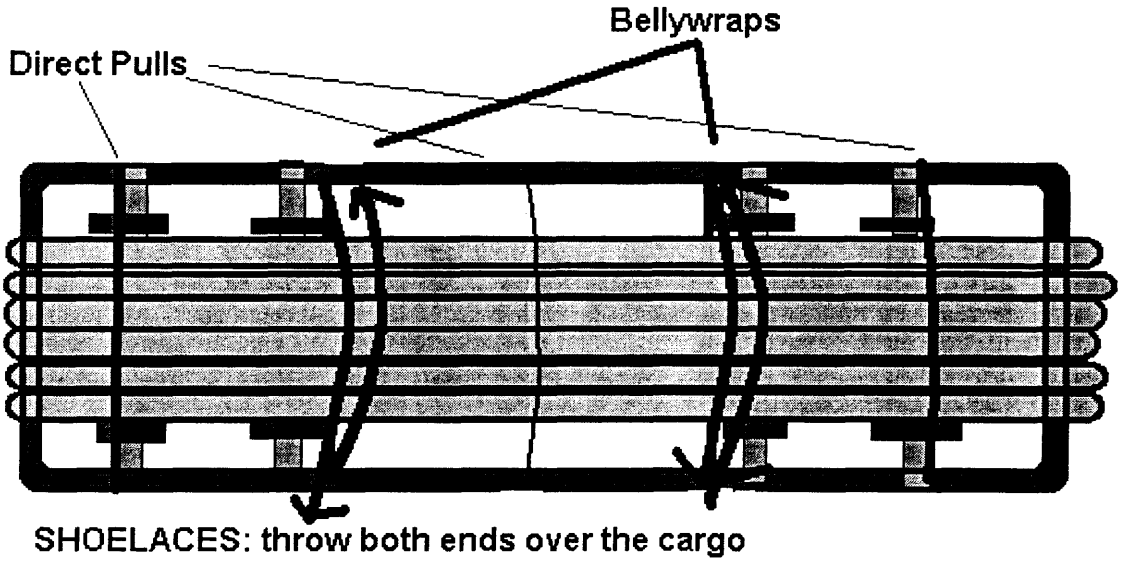
2. Overlap and connect 2 chains together



3. Pull the overlapping hooks to the center underneath the load.

This is the end of step 1.

2. SHOELACES – throw *both* ends of the chain over the cargo.



3. SECURE AND BIND.

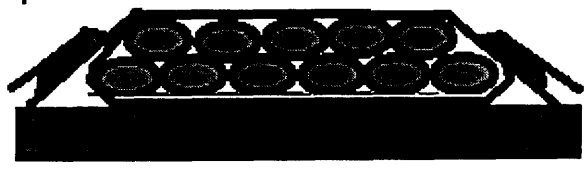
Secure the chains to the rub rail they way we showed you in the beginning of this manual (around the spool and around the pipe stake pocket). Because we have excess chain on both sides, we are going to use one binder just to use up the excessive chain and then we will use the second binder on the opposite side to actually tighten.

Before we bind the second binder we should:

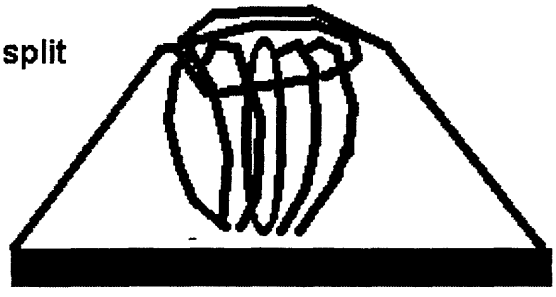
1. Make sure there are two strands of chain on top of the cargo and one strand (with the overlapped hooks) on the bottom of the load.
2. Make sure the two strands of chain on top of the load run parrallel to each other, and are not crossed over each other. (If this happened the top chain would be "choking" the bottom chain and we would not be getting our *bellywrap* tight).
3. Make sure the twists are taken out of the chain as much as possible.
4. Make sure that the two top strands are close together and straight across the cargo. (The more you spread them apart, the more the cargo can move before the chains tighten and choke the cargo).
5. Make sure you ran the hooks to the front of the trailer because we prioritized limiting the forward movement (it will still limit backward movement, but remember, we want that immediate braking action around the spool to stop forward movement).

Bellywrap illustrations:

Pipe



Top bellywrap for split coils, tubing, etc.



Side view of pipe bellywrap

At least a minimum of two bellywraps should be used on a load of pipe. This would allow you to run the hooks to the front to stop forward motion on one and run the hooks to the rear on the other to prevent backward motion.

PIPE

The majority of pipe will be oil field casing, tubing, and line pipe.

Loading Procedures for Pyramid Pipe Loading

1. **2 pipe stakes on opposite sides of the trailer while loading.**
2. **4 4x4s spaced evenly on the trailer floor. The length of the pipe determines placement of the 4x4s. Pipe weight is linear. The weight will show up on the tractor/trailer tandems depending on the placement of the 4x4s.**
3. **Place 2 chains across the trailer floor as belly wraps.**
4. **Load and collar the first layer of pipe. Chock the front and back 4x4s. Complete the loading.**

5. After loading, have the forklift operator hold the mast of the lift against the load. Throw over 6 chains and secure the load. These, along with the belly wraps will total 8 chains.
6. Each load must have no less than 2 belly chains and 6 tie down chains. Always operate binders from the ground, never under any circumstance work on top of a load of a load of pipe.

Load Procedures for Stripped Pipe

1. 2 pipe stakes on the opposite sides of the trailer while loading.
2. 4 4x4s spaced evenly on the trailer.
3. If requested, pad the 4x4s and the pipe stakes.
4. Load, collar, and chock the first layer of pipe.
5. Strip the next layer, make sure no gaps exist between the joints of pipe, and chock. Two (2) chains and bind tight.
6. Load two (2) or more layers, watching for gaps then chock and chain down tight.
7. Load remaining pipe and then bind four (4) chains tight. A total of eight (8) chains.
8. Always place the securement devices, straps and chains, as close as possible to the inside of the stripping and 4x4s.

NOTE: ALWAYS OPERATE FROM THE GROUND. NEVER GET ON TOP OF THE LOAD. IF THE PIPE CRATERS, THERE IS LITTLE OR NO CHANCE TO ESCAPE INJURY.

Unless otherwise requested, use chains. NEVER travel down the highway with the pipe stakes unsecured in the pockets of the trailer (*Use a bungee to hold the pipe stake into the pocket*). Unlimited damage can occur if the stakes come out during travel.

Fabricated pipe (Spaghetti Pipe)

Pipe loads of this nature are hard to secure and are always settling and moving during transit. Drivers must be prepared for the unexpected when loading and unloading. Drivers should closely observe the load during transportation. Position pipe stakes along the sides, back and front of the trailer. Secure the stakes to prevent them from coming loose during transport. Unless otherwise requested secure the load with chains.

NOTE: SETTLING WILL ALWAYS OCCUR. TIGHTEN THE STRAPS OR CHAINS WITHIN 25 MILES OF LOADING, EVERY 150 MILES OR 3 HOURS AND EVERY TIME YOU STOP UNTIL SETTLING STOPS. SECURE THE WINCHES TO THE TRAILER WITH BUNGEE CORDS OR ROPES TO PREVENT WINCHES FROM FALLING IN FRONT OF

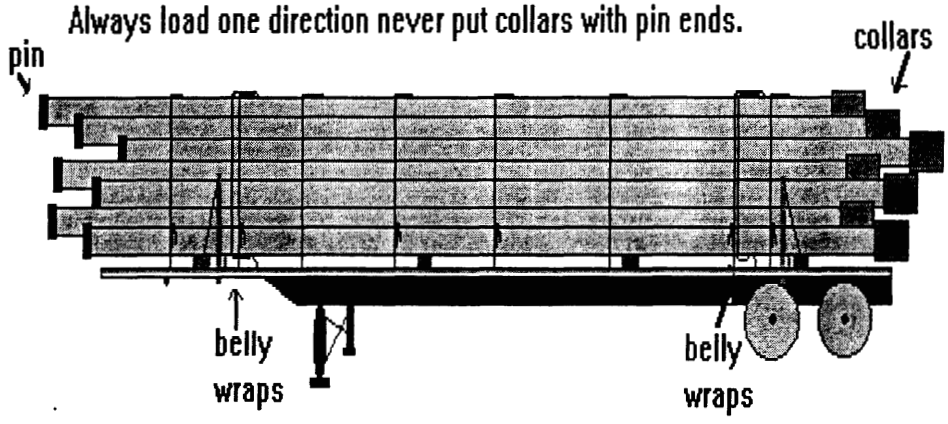
TRAFFIC SHOULD THE STRAPS BECOME LOOSE FROM SETTLING. ALWAYS SECURE THE TRAILER NO MATTER WHAT TYPE OF LOAD YOU HAVE.

PIPE

Casing,Tubing, Drill pipe and Line pipe.

Pyramid loaded pipe requires 4 4x4s spaced evenly on the trailer floor. This is for supporting the pipe and distrubing weight throughout the trailer. 10 chains are used on this load, 6 over the top 4 being used as belly wraps. Binders should be alternated as to not pull the load one direction.

Always load one direction never put collars with pin ends.

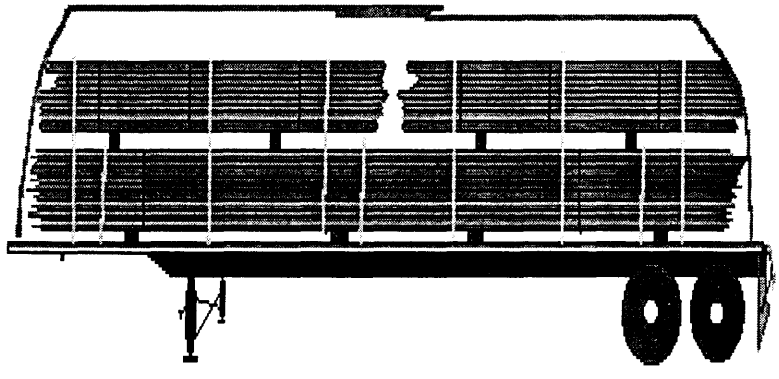


Pipe stakes should always be used while loading and unloading

NEVER get on top of the pipe for any reason

SOUTHWEST TUBE MFG

3 STRAPS ON THE BOTTOM LAYER TO SECURE AND CONTAIN THE LAYER SOLID. 3 STRAPS OVER OTHER 2 LAYERS ALTERNATING WINCHES TO BOTH SIDES OF TRAILER. STRAPS SHOULD BE PLACED OVER OR CLOSE TO THE SUPPORT TIMBERS.
WARNING; WHEN LOADS REQUIRE TARPING LOOK FOR RUST AND ANY DAMAGE BEFORE TARPING



Conoco Pipe Load S.O.P

Current Problems:

Loads have broken the dunnage on at least one layer when only three (3) 4x4's have been used.

Styrofoam has been used as padding to prevent dammage to the pipes. When the styrofoam gets wet, the contact between the styrofoam and the plastic coating on the pipes allows the pipe to slide.

Drivers not rechecking the tightness of straps.

Main points on loading:

- ***Use adequate dunnage.*** **A minimum of four (4) pieces per layer are required. A total of twelve (12) pieces for an entire load. Loads are breaking dunnage if less than four (4) pieces per layer are being used.**
- ***4x6's should be used on this load.*** **4x6's will be made available at the shipper and are required to be turned in at the consignee.**
- ***Carpetting (or rubber strips)*** **should be used on the dunnage and on padding to prevent slippage.**
- **A *3-3-4 layering* effect should used when strapping (see diagram below)**
- ***Winches should be alternated*** **on either side of the trailer to balance the pull down on the load and to keep the load from shifting to one side.**
- ***Straps must be retightened*** **or rechecked for tightness within 25 miles and again at the closest safe area after reaching the interstate. Then every 3 hours or 150 miles and every time you stop.**
- **Center load on trailer both front to back and side to side.**

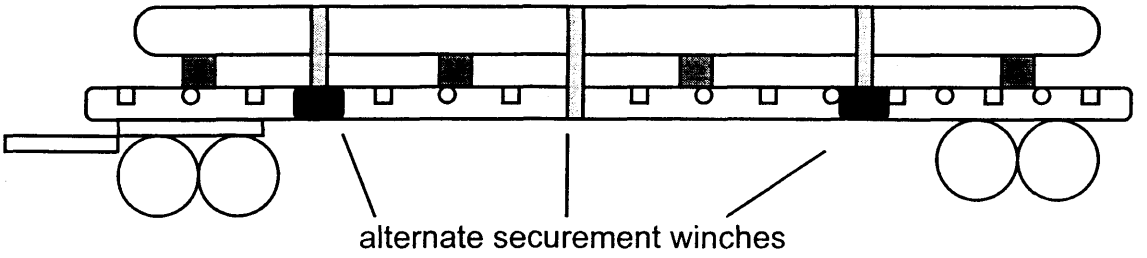
Load specifics:

Pipe load
40 feet long
20 inch diameter
3 layers of 4 pipes each
plastic coated
company provides 4x6's and carpetting for padding
requires 10 straps and winches

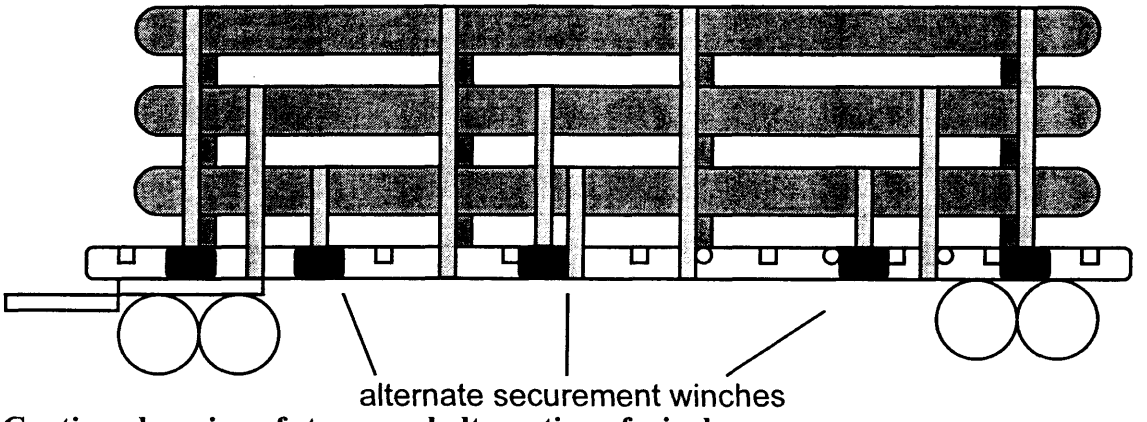
Place 1st two 4x6 pieces of dunnage equidistant from the ends of the trailer. If the pipe is 40 feet long and your trailer is a 45 footer, you are looking at 2 and a half feet from the front and 2 and half from the rear. Make sure to place the dunnage close to a spool rather than a box on the securement rail. (12/12/00a 48 foot trailer = 4 ft from the ends)

Space the other two 4x6 pieces of dunnage with approximately 10 feet between each 4x6.

First layer of straps should be placed centered between the 4x6's. Put the two end strap winches on one side of the trailer and the center one on the opposite side.



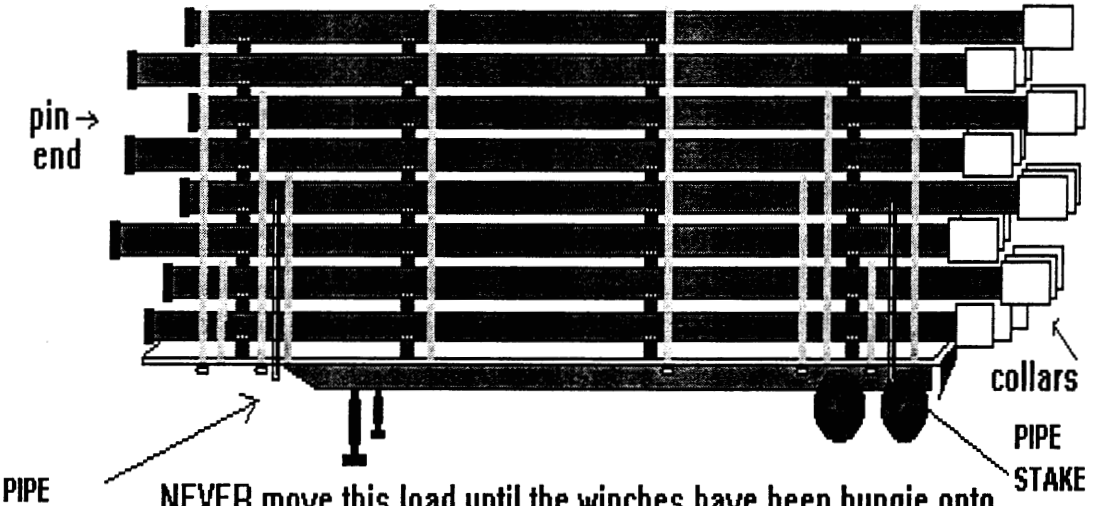
Continue the same layering of dunnage for each layer.



Continue layering of straps and alternating of winches.

Stripped layered pipe

Each layer needs 2 straps per 2 layers. Strap winches have to be arternated on each side of the trailer. Final out with 4 straps over the top. Straps should be placed close to the dunnage as to apply pressure in the area that is soild. All collars and pin ends should always be placed the same direction. 4 4x4s need to be placed on the trailer floor. This will distribute the weight evenly on the trailer.



NEVER move this load until the winches have been bungie onto the trailer.

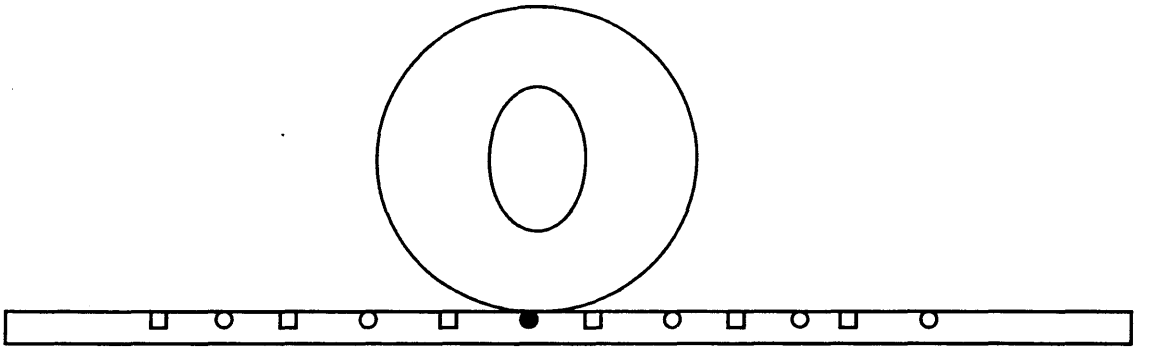
Always chock the 4x4s tight aganist both ends of the pipe before movement.

PIPE STAKES MUST ALWAYS BE USED DURING LOADING AND UNLOADING. NEVER REMOVE STAKES UNTILL LOAD IS SECURED.

COILS

Counter balancing

Coils are one of the best examples of counter balancing. In this case we will look at *counter balancing* the tendency of the cargo to roll back and forth as we accelerate and brake. Notice that the coil is centered over a spool.



Different states have different specific requirements for coils. Your trainer will be able to explain these. In this case we are going to assume the coil is heavy. The heavier a coil is the more securement devices we need to use.

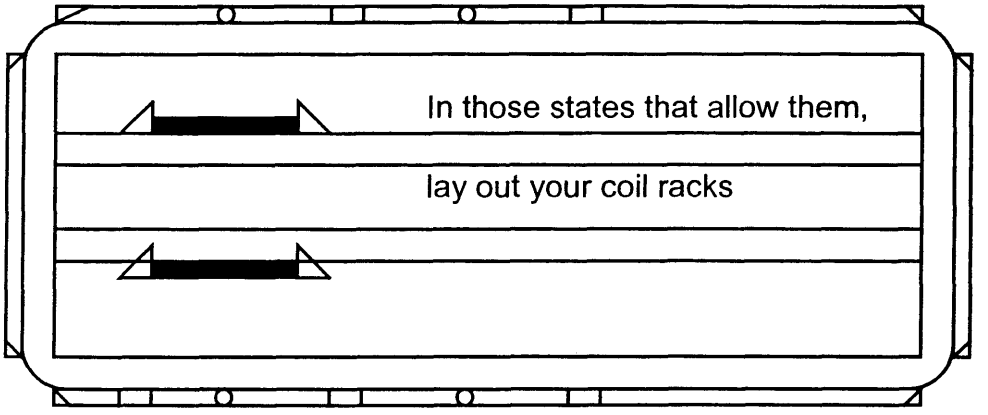
of Chains per weight of Coil

For coils 12,500 lbs or less use a minimum of 3 chains with 1 in the middle and 1 in each direction.

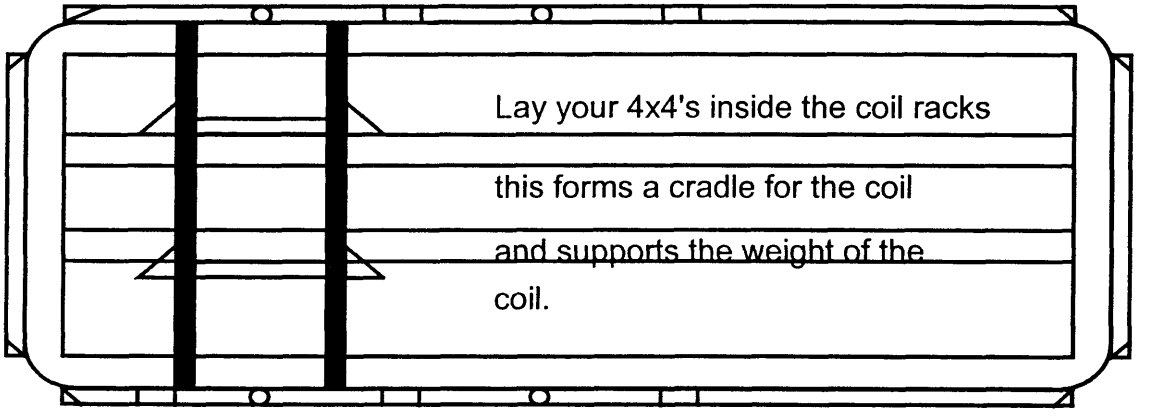
For weights of 12,5000 up to 35,000 use a minimum of 5 chains with 1 in the middle and 2 to the front, 2 to the rear.

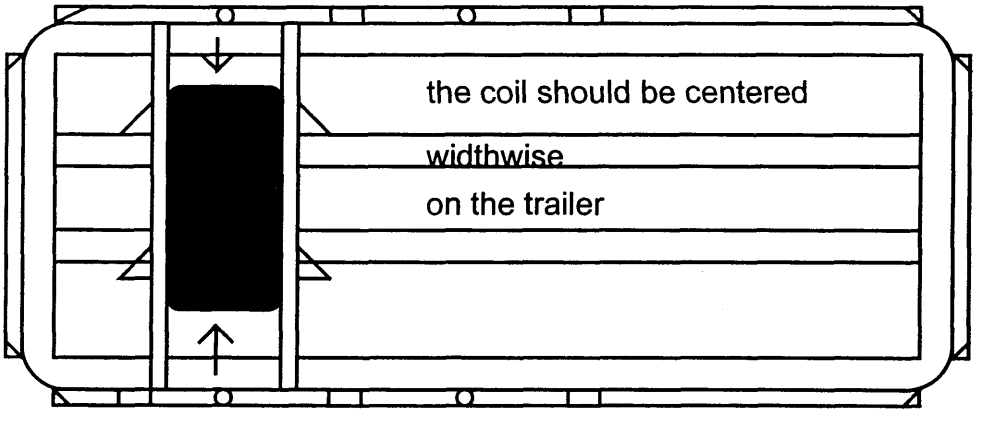
For weights above 35,000 use a minimum of 6 chains with 1 in the middle, 2 to the front and 3 to the rear (the extra chain goes to the rear to prevent forward movement).

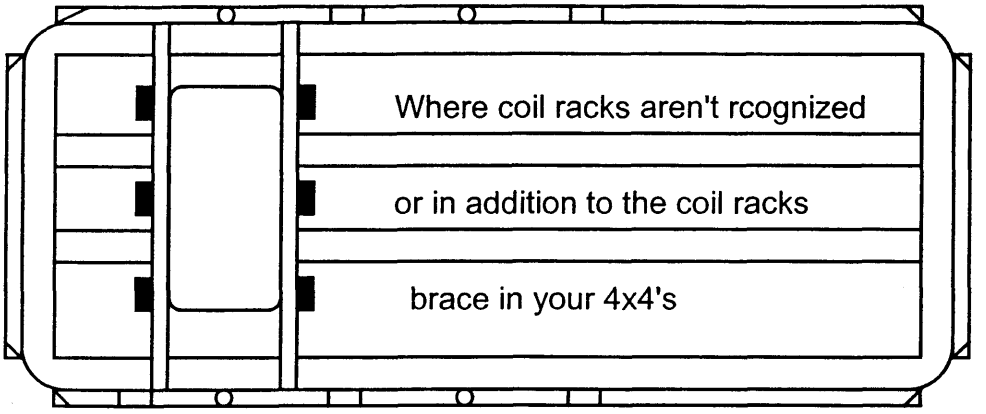
Where are you going to place your dunnage?



In those states that do not recognize using coil racks, you would lay out your 4x4's first, then block in the 4x4's with cleats (bracing- other pieces of dunnage, 2x4's at least 6" long, three per side) before the coil is seated.

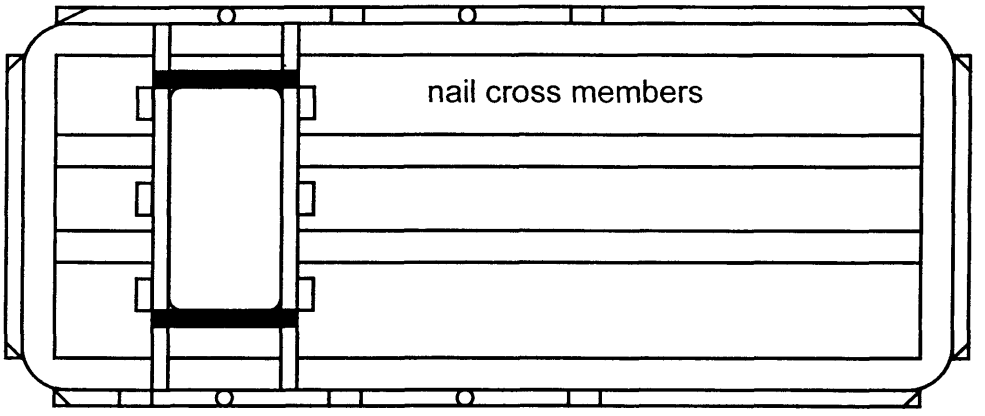




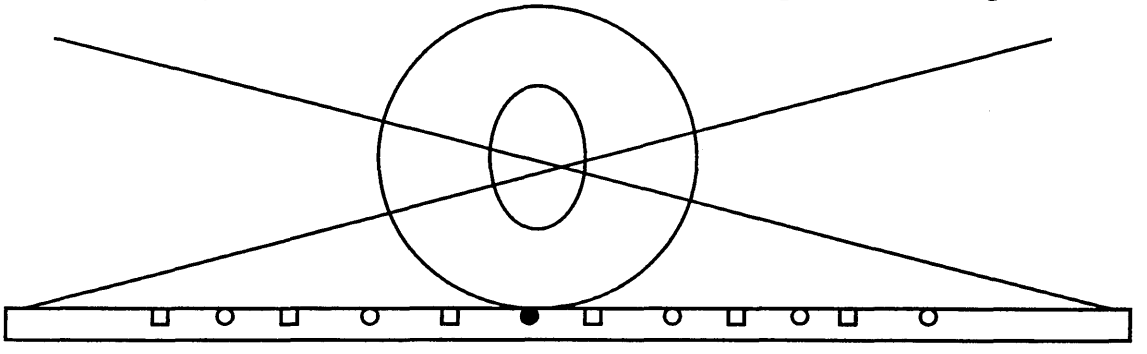


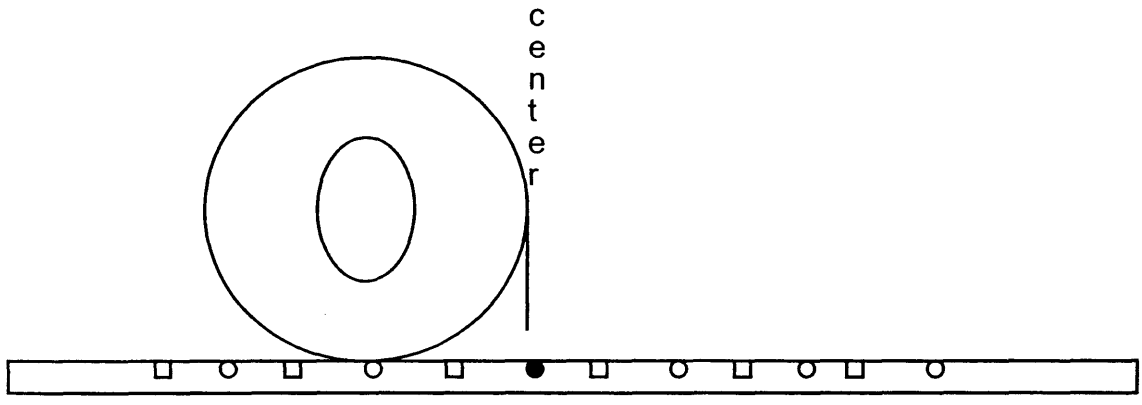
Nail these blocks into the floor of the trailer using 2x4's (cleats) with 3 nails per cleat. California does not allow a nail-split cleat. (See Load Specifics)

To prevent side to side slipping, nail cross members at either end of the coil from one 4x4 to the other



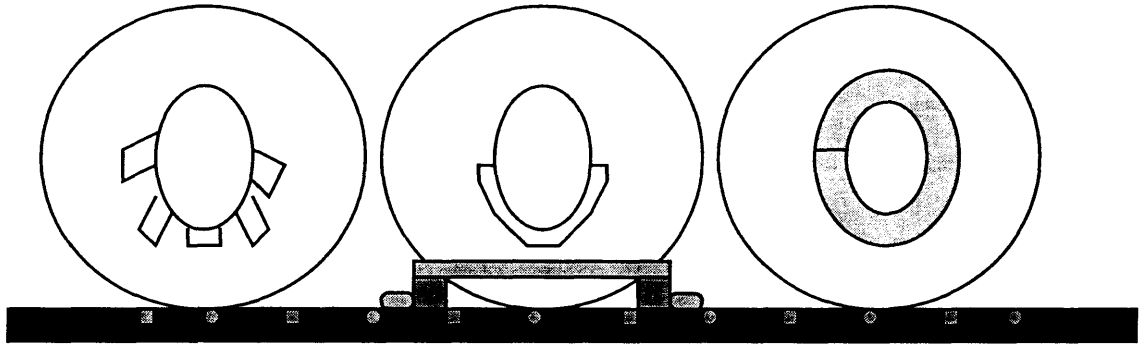
NOTE: Never put a single heavy coil in the center (lengthwise) of the trailer. It needs to be put in front of, or behind, the center to keep from buckling the trailer.



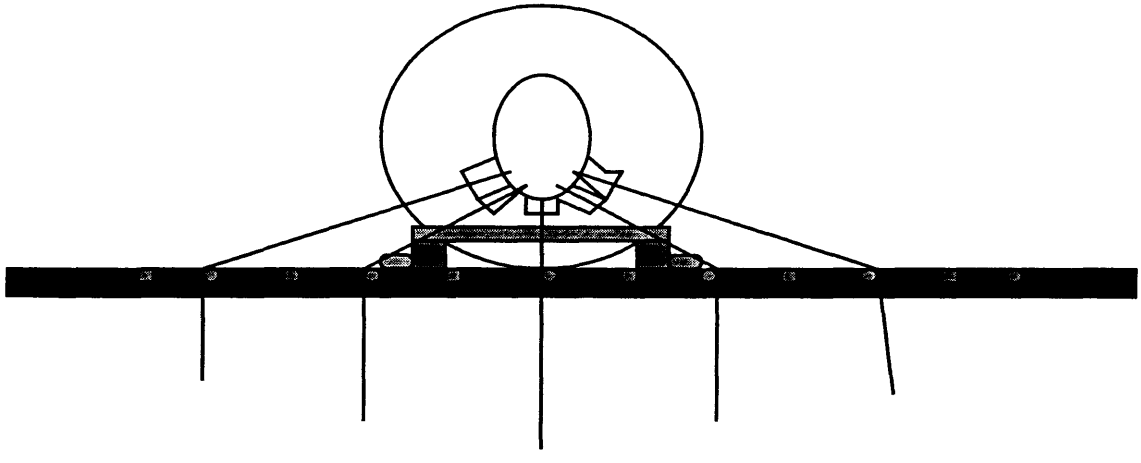


Pad the center hole of the coil to prevent your chains from damaging the coil.

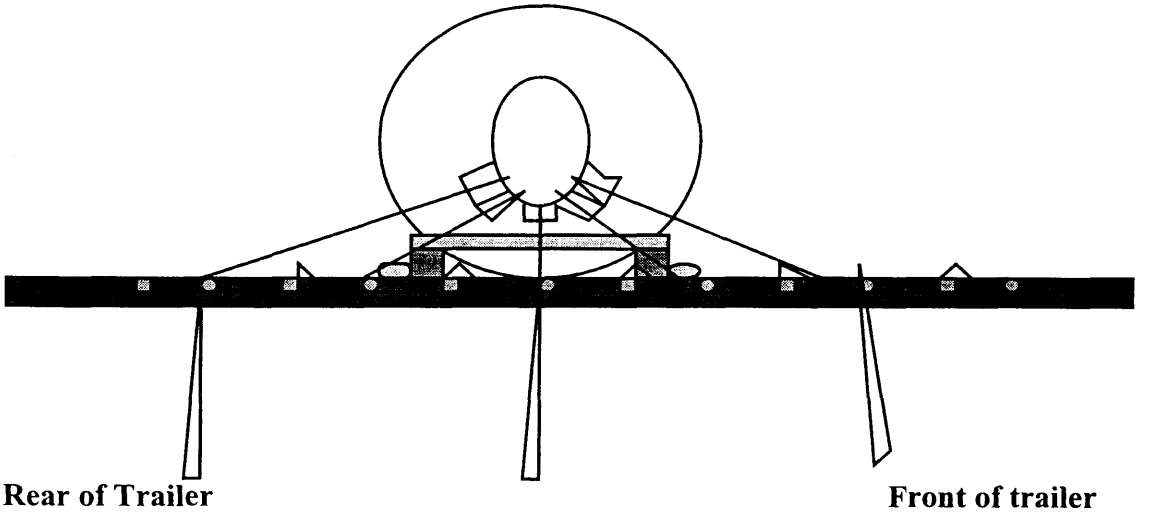
Drivers use different materials to pad. Some drivers use plastic inserts, some use old mud flaps or tire treads. Regardless of what you use, protect the edge of the cargo from your chains when you tighten them down.



Run your chains through the center of the coil.



Secure your chains always around a spool and a box. Let the excess hang down by the spools where you intend to put your binders. Always alternate which side you put your binders on. This will counter balance the pull from side to side. If all your binders are on one side of the trailer, the coil has a tendency to settle in that direction, especially in a turn.



Rear of Trailer **Front of trailer**

Chains 1, 3, and 5 will have a binder attached on this side, that's why the excess chain is hanging down over the securement rail on this side of the trailer. Chains 2 and 4 will be bound on the opposite side of the trailer, that's why they have no excess on this side.

By tightening the binder on chain 3, the center chain first you pull the cargo straight down to the trailer (direct pull). This will balance the seating of the coil in the dunnage. Securing one of the other chains first would pull the cargo in that direction causing the cargo to ride up on the dunnage in that direction.

Tighten the binders on chains 1 and 5 next to balance the pull in both directions. Then go to the other side of the trailer to bind chains 2 and 4.

Notice in the above diagram that the chains to the left of the coil have the hooks running to the front for that tight braking action around the spool whereas the ones to the right of the coil do not. This is because *we prioritized stopping the forward motion*. The chains to the right *will* limit the backward motion even with the wide angle around the spool, but the priority is on stopping the forward motion. One thing you do have to take into consideration is that on the wider angles we have to make sure that the chain isn't hung up on the trailer deck. Take your winch bar and pry up the chain to make sure that it is running in the shortest distance between the spool and the coil.

Once you have tightened all your binders, take the excess chain and wrap it around the binder handle on each chain. As you get to the end of the excess, feed the chain back through a loop of the excess to lock it in place (a half-hitch). Ask your trainer to show you this.

COILS

Coils may be loaded in three (3) different ways.

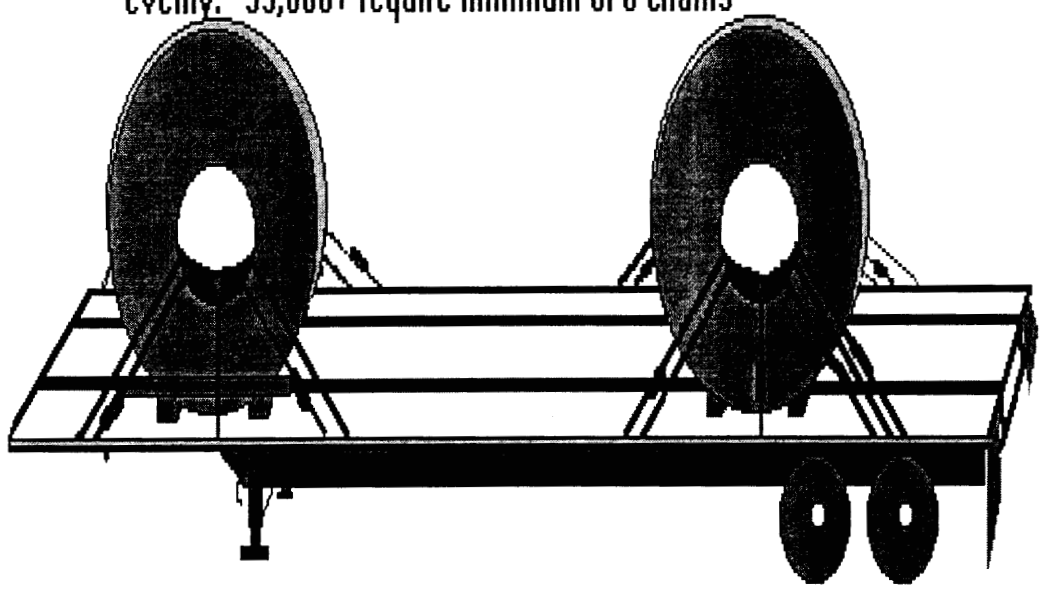
Suicide Load:

(AS DIAGRAMED ABOVE) The coil eye or the inner coil faces out toward the sides of the trailer. They require 2 4x4s and 2 coil racks. If there are no coil racks, use 6 2x4s at least 8 inches long and nails. Place 5 chains and binders, along the padding, between the chains and coil. Before loading, find the loaded weight and check for damage. Knowledge of the loaded weight allows proper placement of the coils to maintain proper axle weight.

Place coil racks and 4x4s on the trailer. Place the coil on the racks and 4x4's, allowing a 1 to 1½ inches clearance between coil and trailer floor to prevent damage to the coil.

Steel Coils going across town or across the USA require the same tiedown.

5 chains minimum binders should be placed on the opposite side of the coils so the weight will settle evenly. 33,000+ require minimum of 6 chains



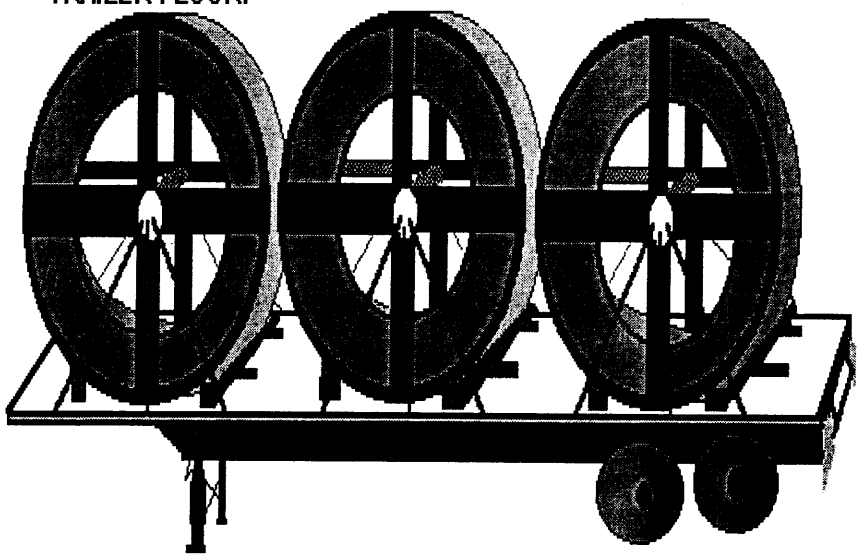
SHORT CUTS IN SECURMENT IS A DANGEROUS HABIT
YOU MAY BE LUCKY TODAY BUT WHO KNOWS ABOUT THE NEXT MINUTE

Coil racks are required to support the 4x4s from spreading under the weight of the coil. The rack should be placed to support the weight 2 racks minimum and 3 under heavier

BICC UTILITY CABLE- LARGE SPOOLS WITH CABLE OR LARGE WIRE.

REELS ARE USALLY METAL AND WEIGH 8 to 20,000lbs EACH.

4X4 BLOCKING IS REQUIRED WITH CHOCKS NAILED TO THE TRAILER FLOOR.



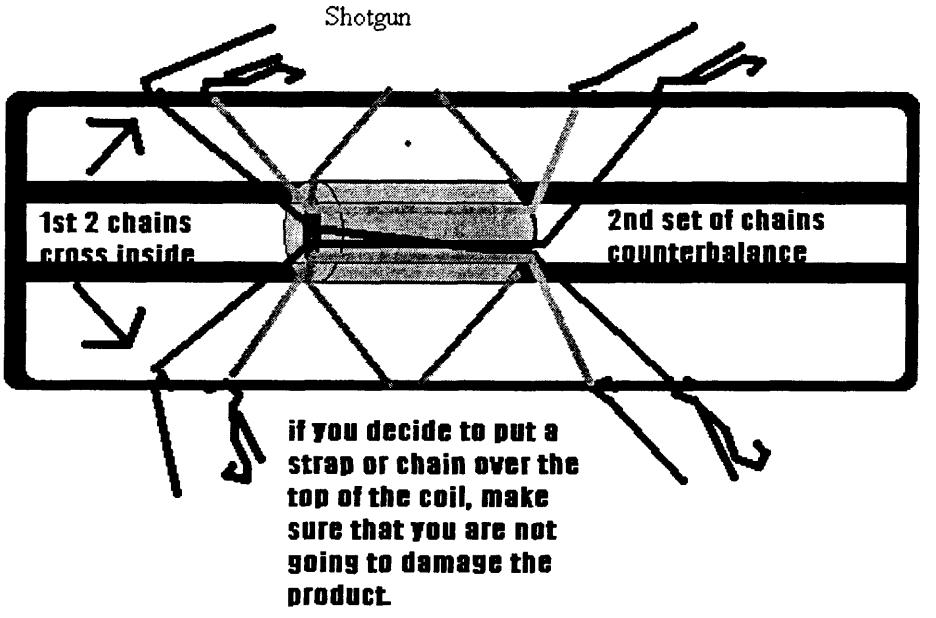
A MINIMUM OF 3 CHAINS THROUGH THE SPOOL EYE IS REQUIRED TO CONTROL WEIGHT FROM BEING TOP HEAVY.

(CAUTION) STAY AWAY FROM USING 2X4 FOR BLOCKING. a 2X4 IS NOT THICK ENOUGH AND WILL BREAK UNDER THE WEIGHT ALLOWING THE SPOOL TO DAMAGE THE TRAILER FLOOR.

Shotgun Coils:

The inner coil faces the front and back of the trailer. Place coil racks across the trailer and put 4x4s into the racks lengthwise, in the center of the trailer. Allow 1 to 1½ inches clearance between coil and trailer floor to prevent damage to the coil.

Secure the coil by chaining from one side of the trailer, through the eye of the coil, and back to the other side of the trailer. Next, chain from the opposite side of the trailer, through the coil eye, and back to the same side of the trailer. Take the third chain over the coil from one side of the trailer to the other (CONTINUE WITH THE 4TH AND 5TH CHAINS. 33,000LBS OR LESS = 5 CHAINS, 33,000 OR MORE 6 CHAINS). California does not recognize a chain over the top of the coil as securement. They require a chain over the center and chains that go through the eye of the coil pulling towards each other. Place padding between chains and coil to prevent damage. If you draw your second set of chains in as shown in the below diagram, make sure that you thoroughly pad the face of the coil roll both in the eye edge and the outside edge.



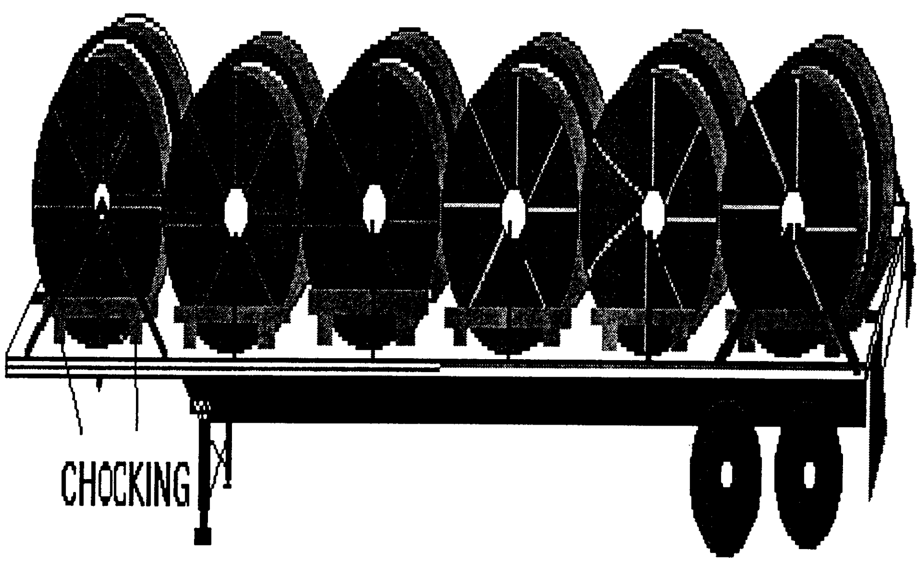
Palletized Coils:

Usually the coils will be flat and banded on the pallet. They require 3 chains, 2 chains crossed over in an "X" fashion and one directly over the center. Use padding to prevent damage.

Spools:

Spools and containers loaded lengthwise on the trailer require chaining and chocking. Chain through the eye of the front spool and pull towards the back of the trailer. Pull the remaining spools straightdown or slightly towards one another to prevent movement. Chock the front and back spools by nailing chocks, or blocking, against on the trailer floor.

WOOD SPOOLS CONTAINING WIRE ALUMINUM OR
COPPER ARE LOADED AND BLOCKED BY THE SHIPPER.
BLOCKING IS NAILED TO THE TRAILER FLOOR UP
AGAINST THE SPOOLS.
TIEDOWN: CHAINS THROUGH THE EYE OF THE SPOOL
2 CHAINS ON FRONT ANGLED - 2 ON THE BACK ANGLED
REMAINING CHAINS PULLING STRAIGHT DOWN. IF LACKING
ENOUGH CHAINS STRAPS SHOULD BE USED ONLY IN
THE MIDDLE SPOOLS AS TO PULL STRAIGHT DOWN

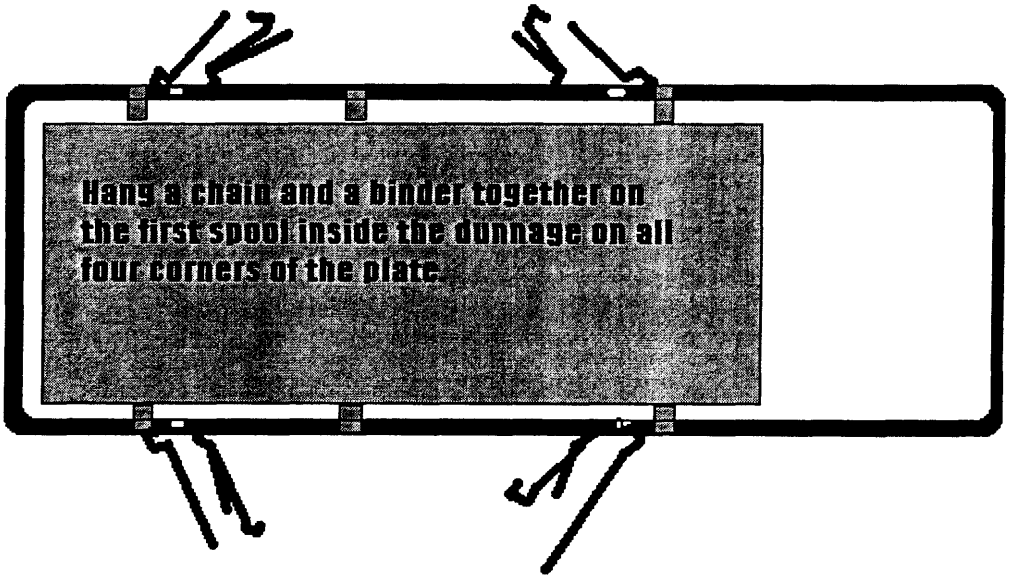


CROSS CHAINING

Cross chaining is used to prevent back and forth motion whether for plate steel or a container or other cargo. To cross chain a load you want to look at the balance of pull on either side and all four corners. You will need four (4) chains and four (4) binders, two on either end to cross chain both the front and the back. One chain on each end will go over the corner of the cargo and go underneath the opposite corner on the other side of the trailer.

Plate is most likely to move up and down due to road vibration, this creates the spread apart effect and the floating effect that will cause them to slice through the cab of your tractor if you hit the brakes hard and have not accounted for the forward motion.

To *dress out the trailer* place a chain and a binder together on the first spool inside the dunnage on all four corners.

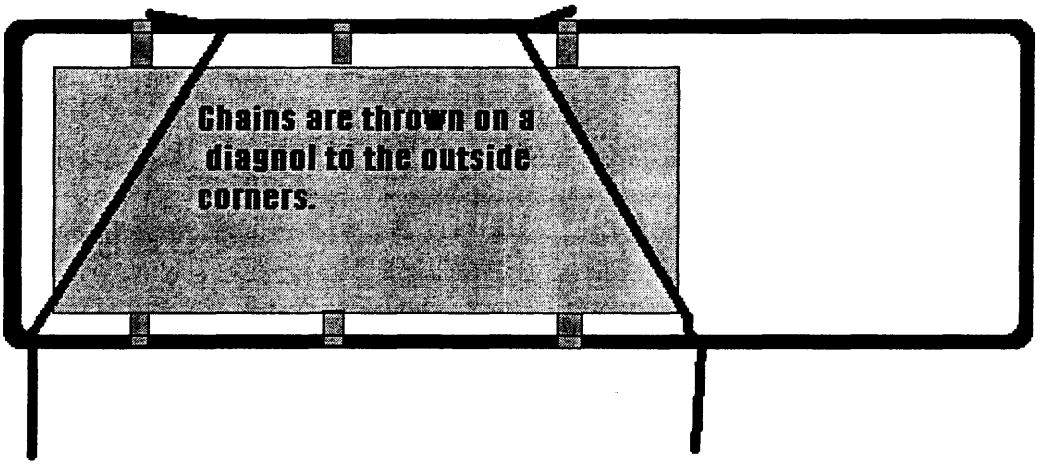


Front of Trailer **Rear of Trailer**

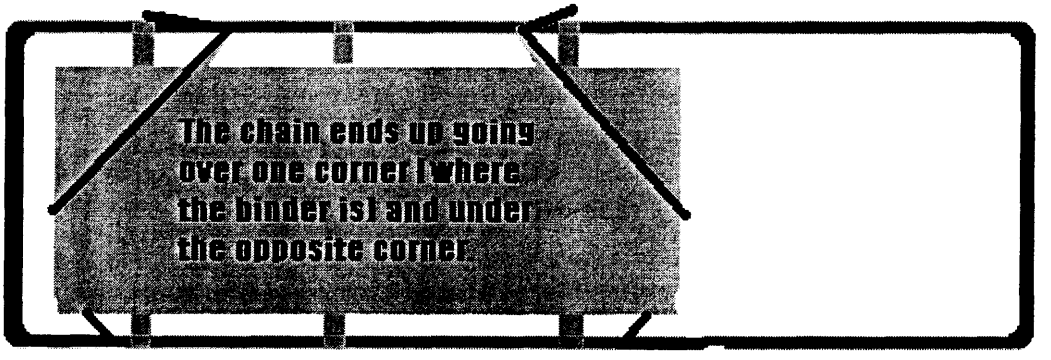
The hooks of the chains on the front of the load/trailer will run to the front. The front chains are restricting the forward motion. The hooks of the chains on the rear of the load/trailer will go to the rear. The rear chains are restricting the backward motion.

How you dress out the load will make the cross chaining easier or harder. The way we have set it up here will put you at the right place at the right time and tell us what we have to do next instead of going chain by chain.

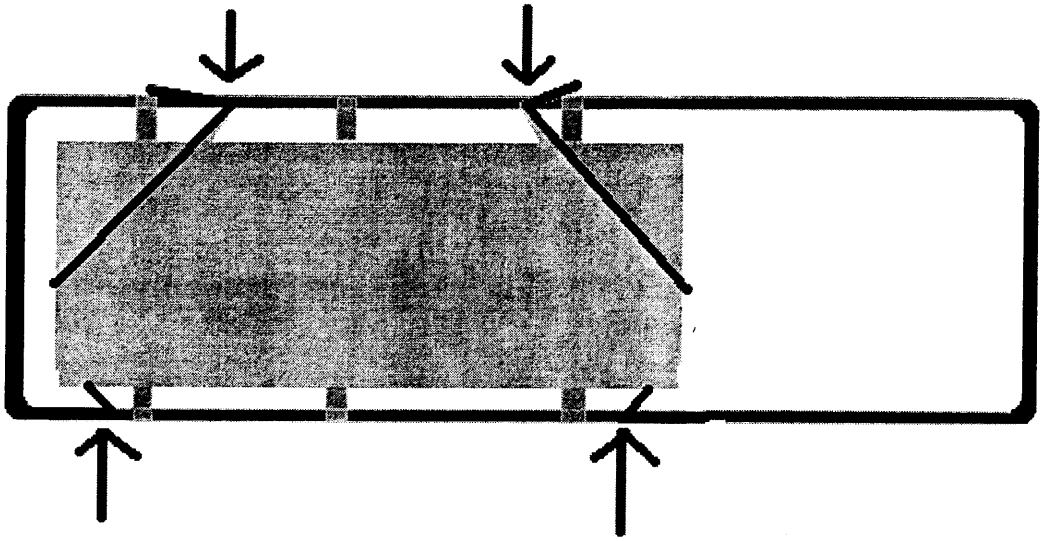
In every other securement technique (direct pull, bellywrapping, counter balance) we have always ended up with the chain secured to spools directly opposite of one another on either side of the trailer. *In a cross chain this does not happen*! The chains are secured to the rub rail where we hung them, but they are thrown on a diagonal to the outside corner.



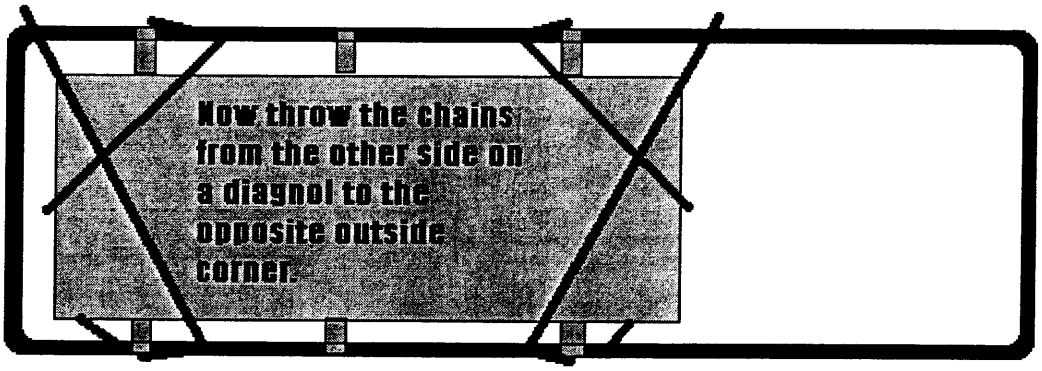
These chains now go over the corner we threw them from and under the other corner of the load.



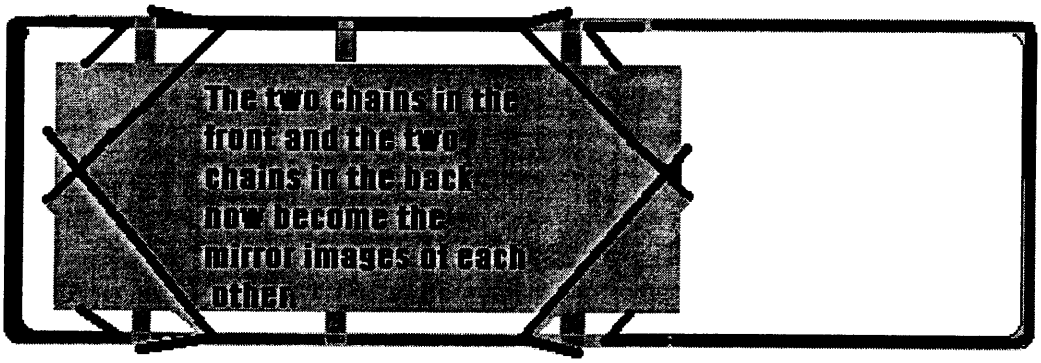
Notice that the spools they use are not lined up directly across from one another, they are on either side of the dunnage in both the front and the back.



The chains on the opposite side that we placed in our original dressing out now become a mirror reflection of the ones that we just secured.

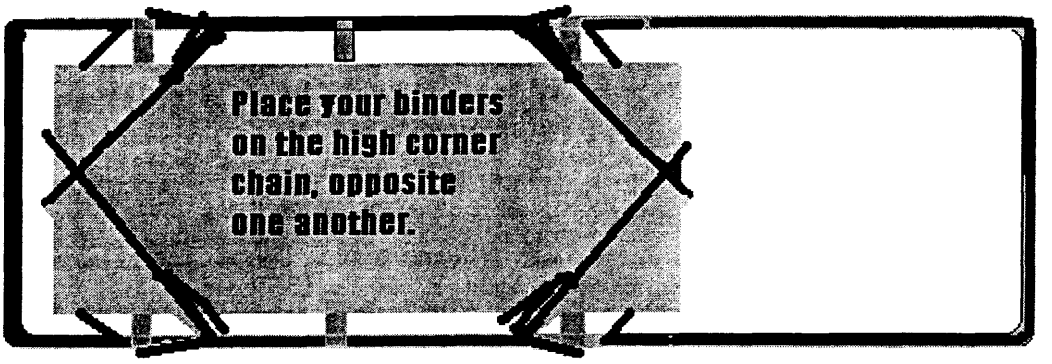


They also go over the cargo on the side you throw them from, and under the opposite corner.



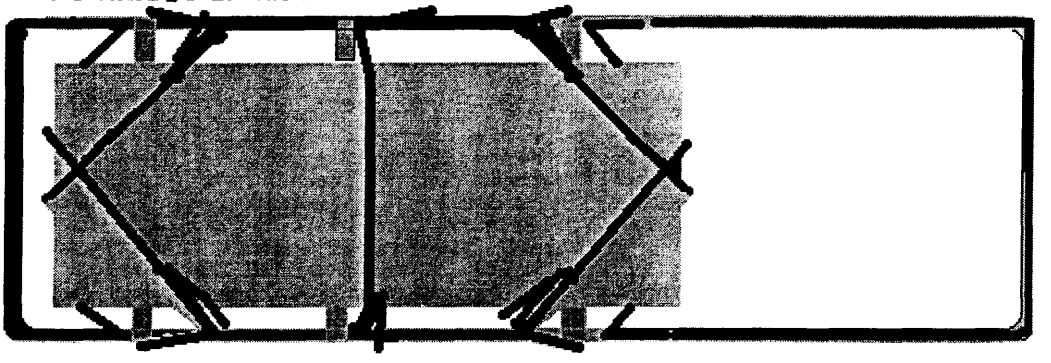
Place your binders on the chains where they were hung when dressing out the load.
This will ensure that: the binder goes on the high corner chain,
All four chains are tightened,

There is a balance of pull to both sides,
A binder will not get hung up when you try to release it against the cargo or dunnage,
The product is held down to the dunnage and therefore the trailer making the product and the trailer one unit.



When we tighten down the cross chaining on either end, the middle of the product will bow. To eliminate that bow and make sure that the dunnage underneath the center of the product does not work loose and fall into traffic we need to secure the center with a Direct Pull.

Chain over the top in center to take bow out of the material and trap the dunnage under the load.



It does not matter which side you put the binder for the Direct Pull on.

The same idea is related in the next figure.

The trailer will flex under the weight of the load. The steel plates have been cambered by the cross chain effect so that the center of the plate can flex upward. This means that the center 4x4 is uncontrolled. It can work its way out from under the load. By placing a chain directly over the 4x4, you control this effect. This will also work with layered plate where you have dunnage separating the layers.

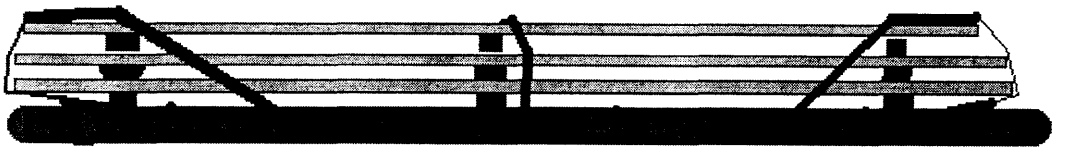
STEEL

Steel plates will vibrate and move around on the trailer during transit. Cross chaining the front and back of the load will eliminate movement in those directions. Chains across the plates, combined with the cross chains, will adequately hold steel plates.

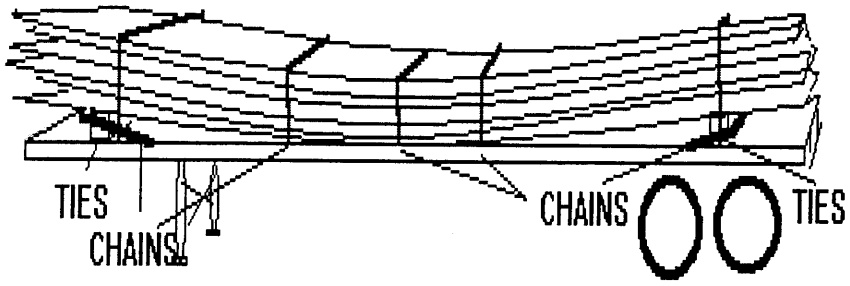
Plates of different gage (thickness) will be separated by wood for unloading purposes. The wood will move toward the edge and off the trailer, so chains should be placed over the wood and pressure applied at those points.

Securing loads of steel plate with straps is not common. However, when required to do so, place padding of some kind under the straps. STEEL PLATES WILL CUT STRAPS!!! Tarp loads when required by the bill of lading. Direct any questions concerning this type of load to the Tulsa Terminal.

Side View



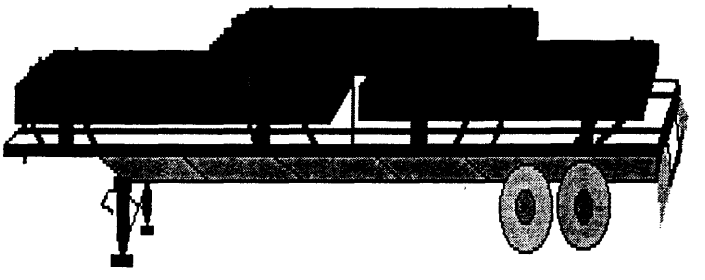
MATRIX: CURVED PLATE STEEL SUPPORTED BY 6X8s or RAILROAD TIES. CHAINS CAN NOT BE PLACED OVER THE ENDS AS IT WILL TAKE THE BEND OUT OF THE STEEL PLATE. CHAINS SHOULD BE PLACED IN FRONT OF TIES CONTAINING THEM FROM MOVING AWAY FROM STEEL. 7 CHAINS MIM NO STRAPS ALLOWED.



Copper Load:

This load requires chains not straps. Most shippers have no requirements on what type of securement is to be used but chains have to be the rule. These loads are heavy and straps will not contain any forward movement.

Chains should be crossed in the front of each cake and then at least one chain over the cake holding it down to the trailer floor.



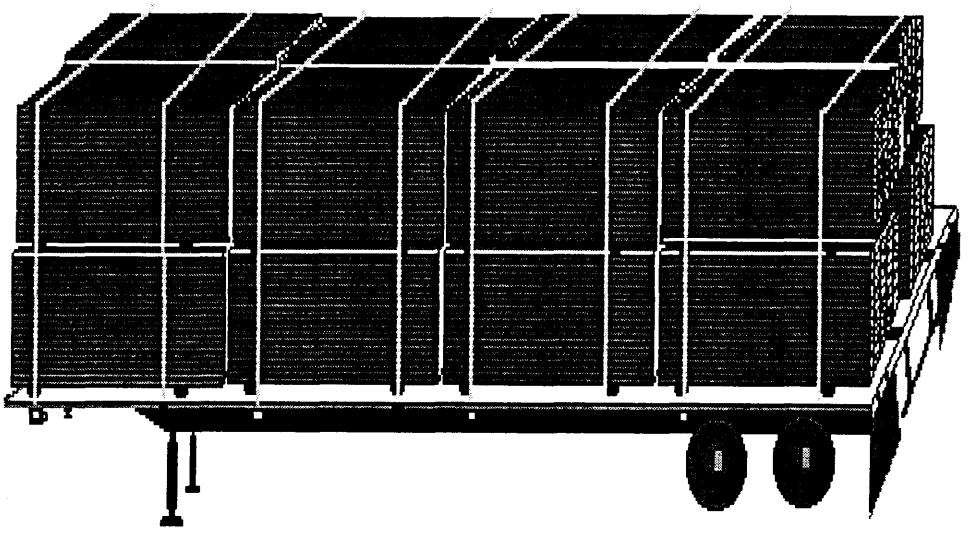
COPPER CATHODS

These loads are banded together in bundles, and loaded on the trailer without any dunnage between cathod stack and trailer. Chains are the recommended tie-down, but straps may be used if short on chains. "WARNING" padding needs to be placed between straps due to the sharp edges on the cathods.

Another loading procedure could be single bundles loaded in the middle of the trailer from the front to the back of trailer.

LUMBER

Loads of lumber must be tarped unless otherwise requested by Dispatch. Protect the tarps against lumber damage. Padding under the tarps on the ends of the lumber stacks will usually leave the tarps undamaged. Alternate the winches from one side of the trailer to the other to keep the lumber in the center of the trailer. Pulling from both sides of the trailer pulls from the center of the load down and prevents shifting. Top heavy loads require caution on access ramps and curves.



CRATED LOADS

Crated or wood framed cargo requires special consideration during securement and transport. Find the strongest points in the crating. The crate bracing and cargo position in the crate determines where to secure. Direct any questions regarding securement to the shipper of the safety department. Drivers should assure proper load securement. Will the securements cause the crate to fall apart? Will the crating get into the cargo? Do the securements pull with or against the bracing? Will securements on the crating hold the cargo? If the crating begins to break up or fall apart, STOP at once and call the Training Department. Proper adjustments need to be made before continuing with the load. Never assume the crating will stay together once it begins to work apart.

GLASS

Most glass loads will be crated in wooden "A" frames. If the "A" frame is poor quality, notify the Safety Department before accepting the load. Conditions while tarping is very important. Water will weld the glass together and destroy it. If the tarps have holes, cover the load with plastic or poly tarp before tarping the load. Pad Corners and edges to prevent damage.

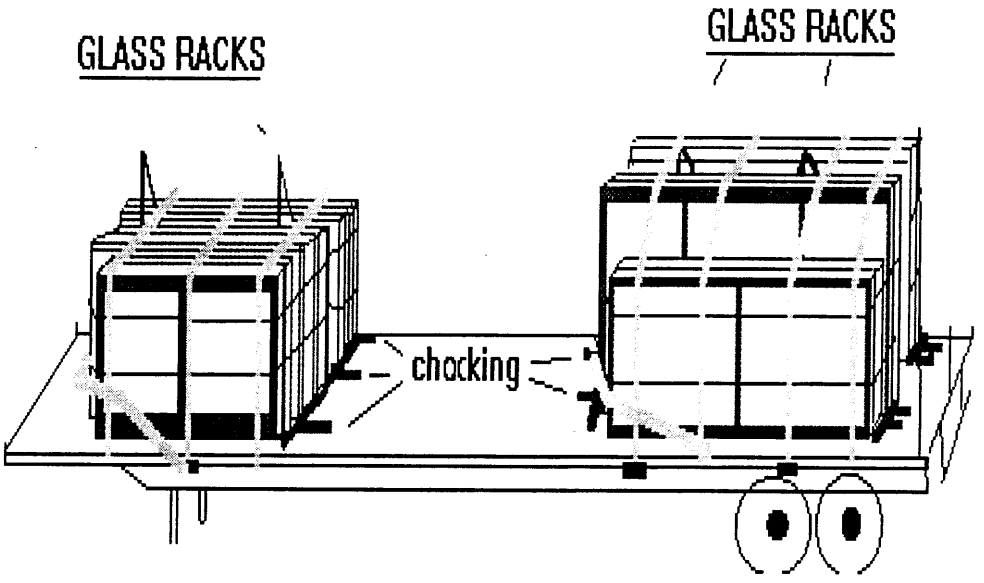
Hold the strap hook when throwing straps over glass loads. This prevents glass damage. Drivers must be careful not to pinch the tarp between the straps and the "A" frame. This will work a hole in the tarp.

It is important to check for leaning or load shifting. If shifting starts during transportation, STOP AT ONCE, check for damage, and resecure the load. If a driver is unable to resecure the load or there is damage, contact the Safety Department immediately. Do not move the load. Use caution when working around glass. Unstable glass can explode, causing injury to anyone in the area..

Always check pre-loaded trailers for damaged glass before hooking up the trailer. Have any damage noted or adjusted on the bill of lading before moving it.

Loads three (3) to five (5) feet tall require a minimum of three (3) straps. "A" frames require a minimum of four (4) straps to each "A" frame. "A" frames are top heavy and require caution on access ramps and curves.

GLASS CRATED AND BANDED TOGETHER IN GLASS RACKS.
RACKS ARE USUALLY METAL AND NEED TO BE PADDED
WELL TO KEEP FROM RIPPING TARPS.
TIEDOWN: STRAPS OVER THE ENDS OF THE WOODEN
CRATES PULLING STRAIGHT DOWN TO THE TRAILER.
ALTERNATE WINCHES PULLING LOAD TO THE CENTER.

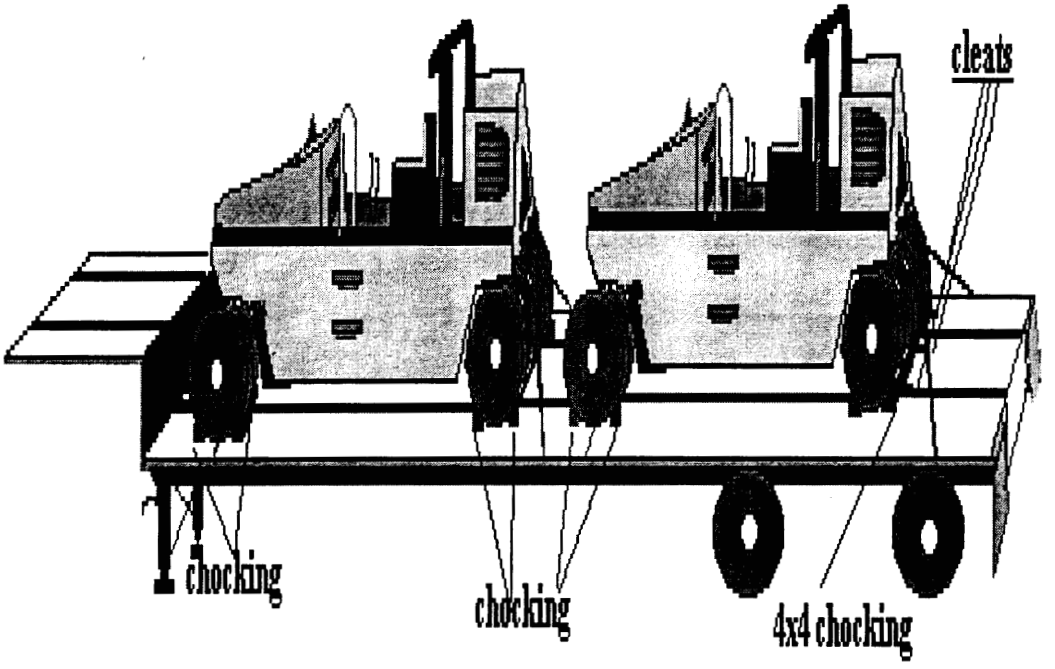


WHEELED EQUIPMENT AND VEHICLES

Two (2) chains pulling in the same direction will not work for securement. Always have the chains pulling in opposite directions and cross boomed. Only secure to solid, in damage able parts. Never secure to parts such as the track or idler pulley that may be damaged. Chock in front of and behind each wheel or track. Direct any questions concerning securement to the shipper or the Training Department before moving the load.

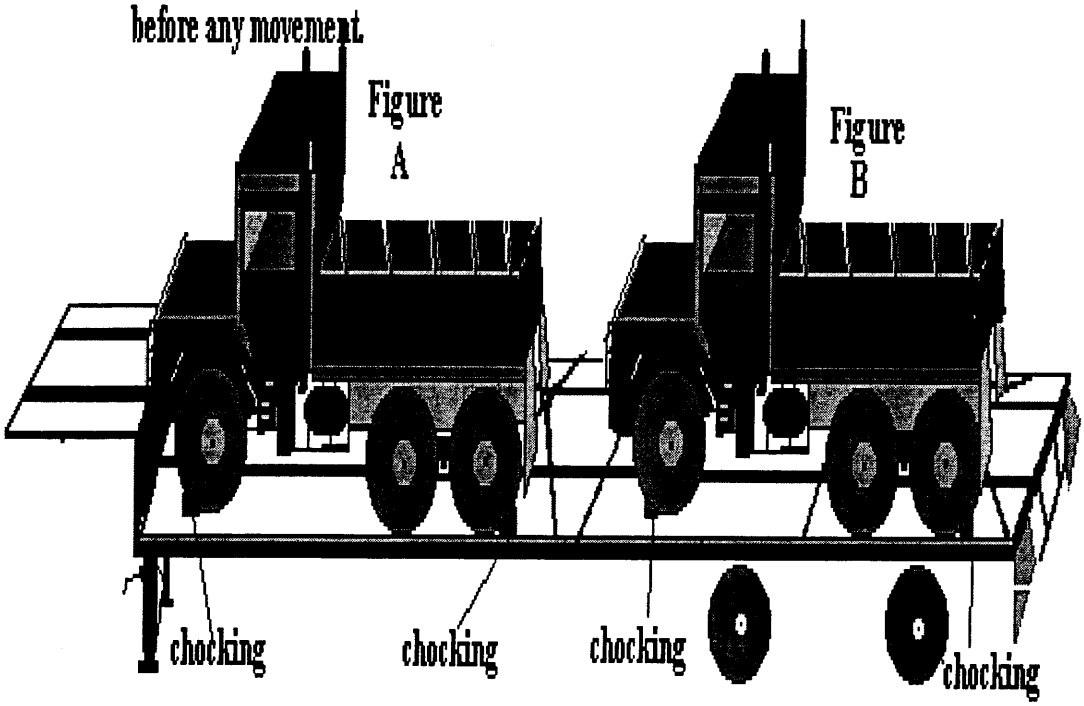
WHEELED EQUIPMENT

Always have the chains pulling in the opposite directions and cross boomed. Never secure to a part of the equipment that is not solid, most have specific areas for chain hooking intended for transporting. Direct any questions concerning securement to the shipper or call training before moving the load.



Chock in front and behind each wheel and securely nail the chock to the trailer floor. When using a 4x4 you should cleat the 4x4 with at least 3 2x4s as shown

Chains are to be use for this tiedown. Two separate tie-downs are shown. (Fig A) This tie-down is cross boomed from the axles watching closely not to wrap around brake lines or damage anything on the axles. (Fig B) This tie-down is cross-chained in the front and is chained through or between the tandem rims making sure the chain is not going to rub against the tire in transporting. Always chock the tires front and back before any movement.

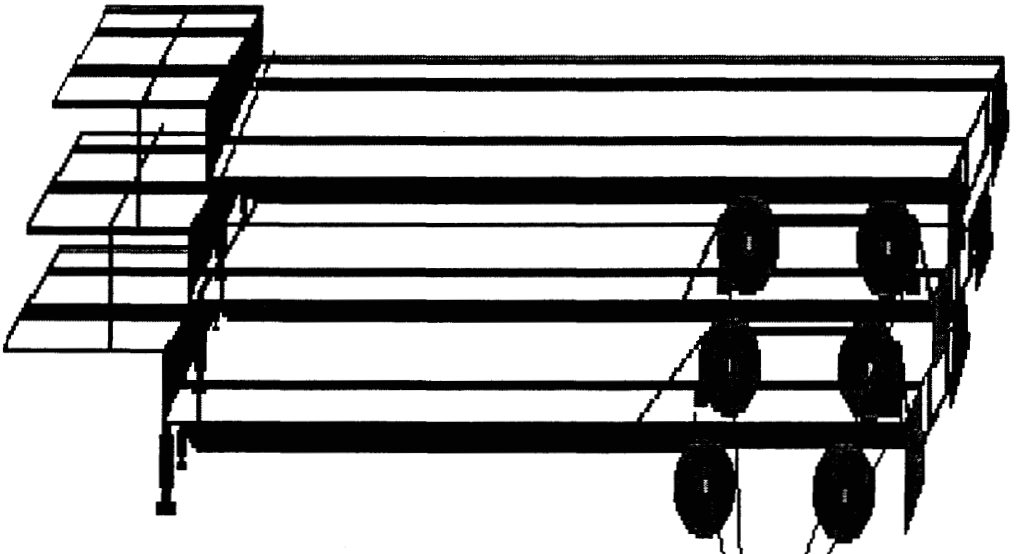


Some Goverment and private vehicles have specific securement procedure these need as per instructed. If questionable call the training department or your dispatch

DECKED DROP TRAILERS

Chains are always required when securing trailers before transporting. Chains should be placed through or between the tandems rims and secured to the trailer, rubrail (CAUTION) keep the chains at a good angle as to not rub up against the trailer tires. This will damage tire and rim.

Two more chains should be added over top trailer binding to the middle trailer, and the same binding down to the trailer being pulled.

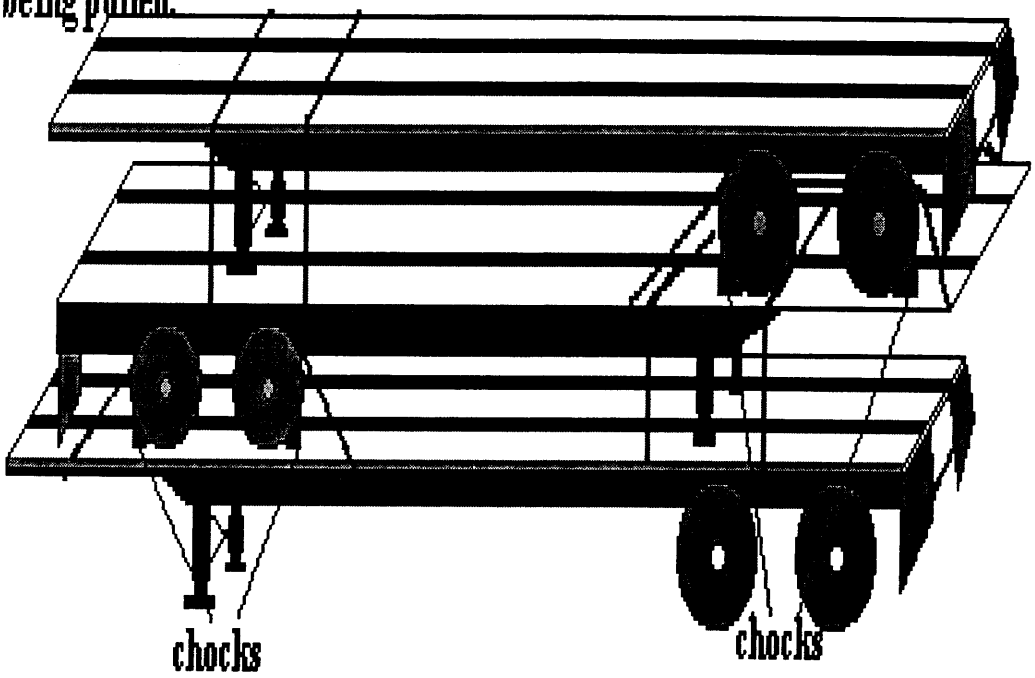


Always chock the front and rear of each tire before movement.

chocks

DECKED FLATBED TRAILERS

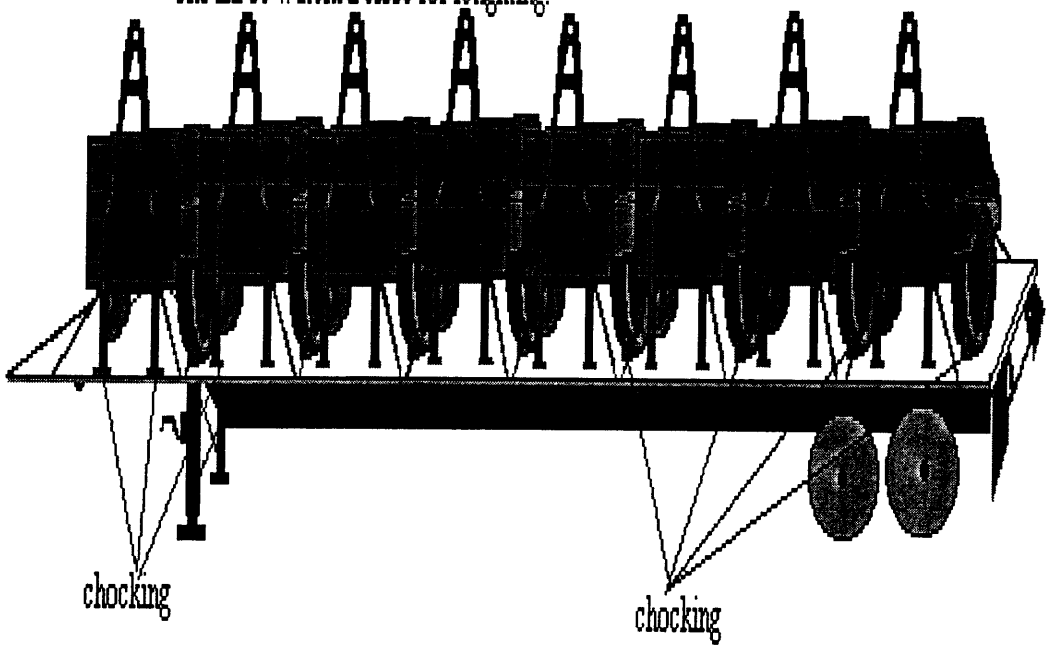
Chains are required for securing this load. A chain should be placed through or between the tandem rims and secured to the trailer rubrail (WARNING) the chain should be placed at a good angle as to not rub against the trailer tire. This will damage the trailer tire. Two more chains should be added over the top trailer binding it to the middle trailer, and the same to the trailer being pulled.



Always chock the wheels before movement. Use a 2x4 or a 4x4 with a chain pulling the 4x4 into front and back of trailer tires.

INGERSOLL-RAND

Compressors loaded in this fashion require chains secured through the tie down eyes on front and back of unit. Wood is to be placed under the trailer hitch between the hitch and trailer. This protects the trailer floor and supports the unit. A 2x4 6 inches long is best. All wheels should be chocked and chains should be watched close for retighting.

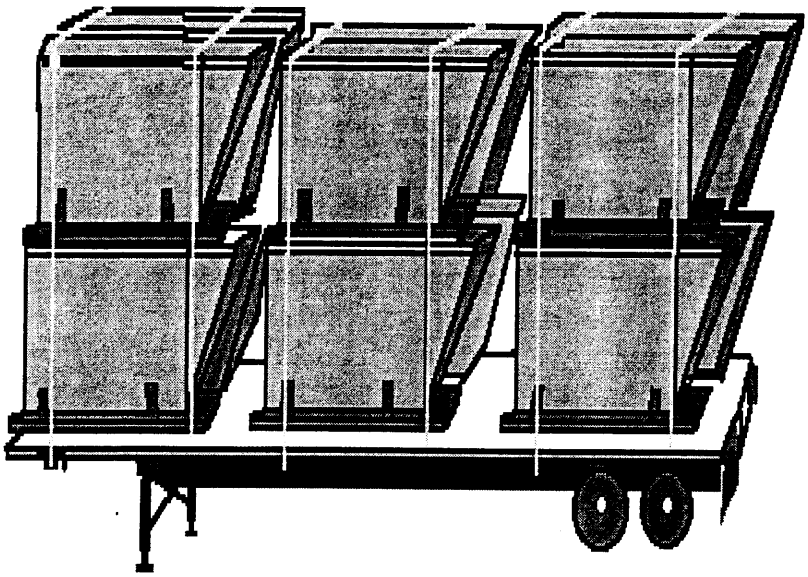


MACHINERY

AAON INC

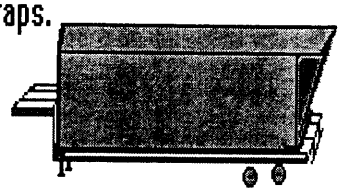
x-strap here

X X X X X X



Air conditioning units are structurally weak and are easily damaged securement ares are indicated by "strap here only" marking on top of the units. Double check marked strapped position on both sides before tighting down straps.

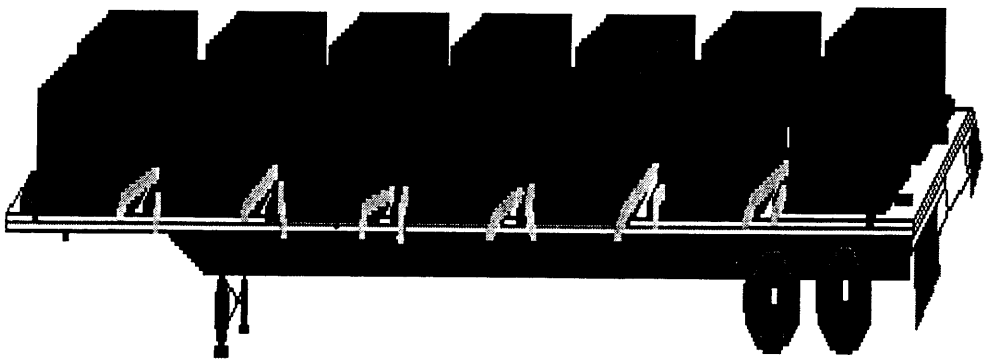
Chains are required on base of larger units

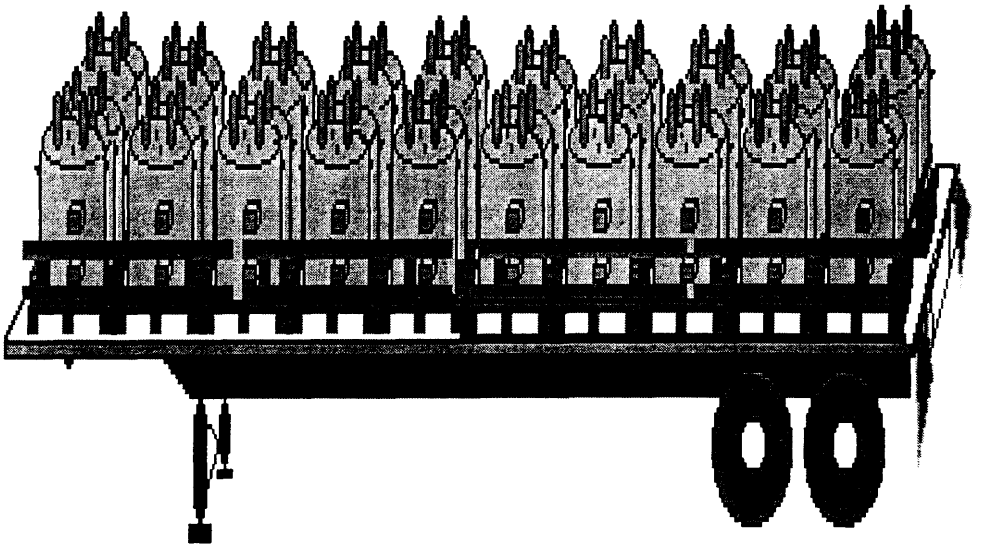


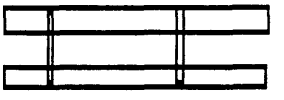
ASEA BROWN BOVERI

Transformer loads from Jefferson City Mo. are bolted to the pallet. Securment of this load requires straps over the pallets. Wood should be placed over the pallet under the straps this secures the pallet and keeps from having to use a strap per pallet.

Never put straps over the top, this will break the weather seal on the doors. It will never seal and will be refused.







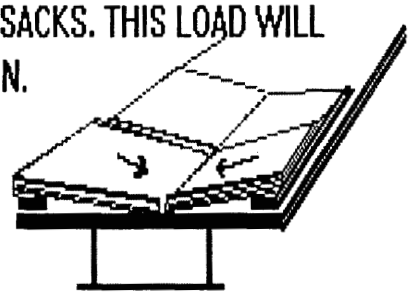
VESSELS

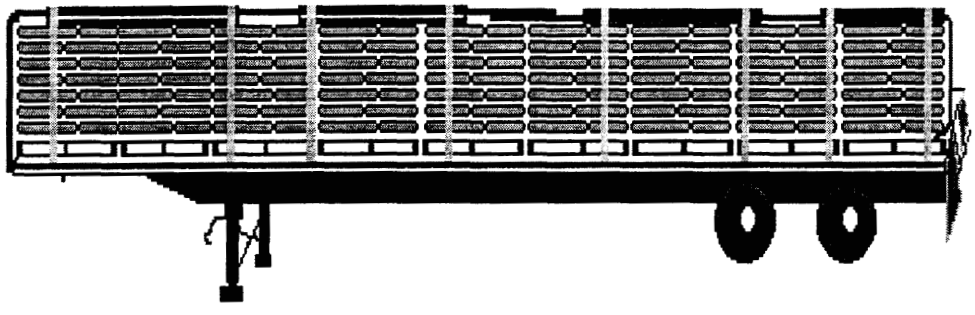
Small or delicate parts (i.e:, gauges, valve handles, regulators, meters, electric motors, and conduit) require special consideration during securement. Direct any questions concerning securement to the Safety Department or Dispatch before loading. Make a secure tie on the cargo structure or framing. Drivers must assure vessel securement. When there is no stand, chock the vessel to eliminate movement. Use padding to prevent damage. When securing insulated vessels, do not chain or strap around the outer insulated shell.

NOTE: NEVER MOVE A LOAD UNTIL IT IS PROPERLY SECURED.

PALLETIZED LOADS

MI DRILLING FLUIDS
100 lbs SACKS STACKED ON A PALLET-1X4s SHOULD BE LAID LONG SIDE THE TRAILER FLOOR BEFORE LOADING THIS TILTS THE PALLETS TOWARDS THE CENTER OF THE TRAILER ALONG WITH ANY MOVEMENT OF THE SACKS. THIS LOAD WILL SETTLE WITH ROAD VIBERATION.





V-BOARDS MADE FROM 1X4s OR 2X4s PLACED UNDER THE STRAPS WILL SPREAD OUT THE STRAP PRESSURE OVER THE LENGTH OF THE V-BOARD. INSTEAD OF THE 4" STRAP AREA.

LOADS

All loads can be transported safely, provided they are properly secured. There is no better guide in the world on how to secure a load other than common sense. Look at the load; determine the strong points and weak points, determine how a load would move and then secure and block and brace accordingly.

If you ever have any doubt about any load and need help with securement, or any other problem, please call the Tulsa Training office.

3 Ways To Measure Your Load Securement (Work Patterns)

Now that we have looked at several loads, let's concentrate on the specific patterns that tell us whether we have done a "good" job or not. The 3 patterns you can look for will obviously have exceptions to them, but the more you hold to these patterns the easier it is to train your eye to spotting "good vs bad" load securement.

1. How is every chain or strap secured to the "rub" rail?

Does every chain go around a spool and completely around the pipe stake pocket? The more you try to hold to a pattern, the easier it is to spot a break in the pattern (a possible mistake.) Does every chain run in a straight line between points? Do the hooks run in the direction of the movement you are trying to prevent? Are any of the chains riding the edge of the bottom of the pipe stake pocket where it can slip up? Can you move any of the chains by hand?

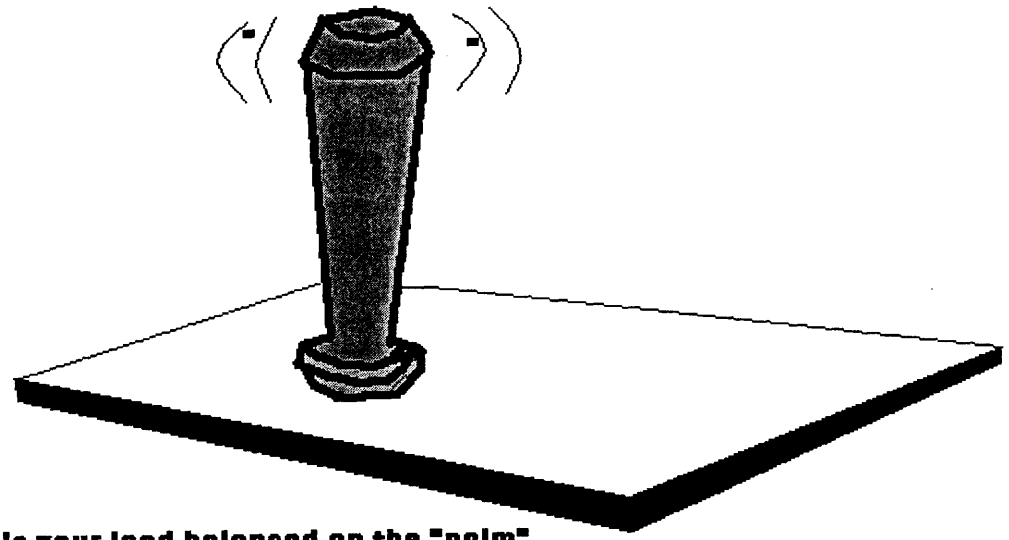
Is the hook of every strap being pulled up onto the rub rail? Does the strap go around the hook to help reinforce it? Is the strap itself rubbing against the cargo or the trailer without being padded over rough or sharp edges? Does the strap go on the inside of the rub rail (high loads) or outside of the rub rail (low loads)? Does every winch have a bungee crisscrossed over the front of it?

2. Is there a balance of pull from front to back?

Stand in the middle of the load or piece of cargo. Are the straps and chains spaced out evenly to both the front and the back. Are the chains and the straps close to where the dunnage is? Are the angles of the chains the same on the front as they are on the back? On a strip and strap load, is there securement on each level or every other level?

3. Is there a balance of pull from side to side?

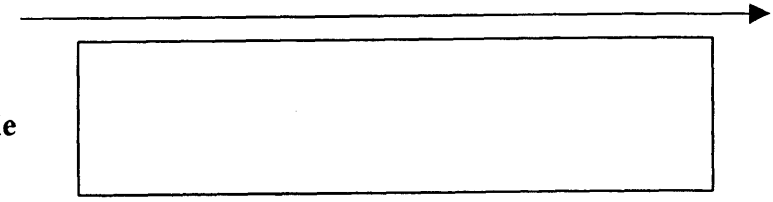
Are all your binders or winches on one side of the load, pulling it that direction? Or are alternated from side to side?



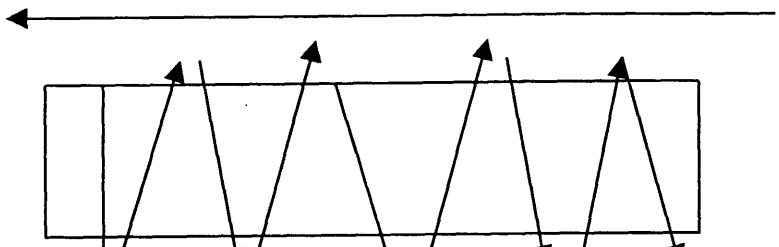
Is your load balanced on the "palm" of the trailer?

Work Patterns

Work One Side At A Time:
Look for work patterns that will take you around the trailer instead of back and forth from side to side:



Work one side At a time



Wastes time

When taking chains or straps off: go down one side taking off bungees, unwrapping chains, popping binders or removing winches, unsecuring chains and hooking the

chain hook back to the chain (hooking the chain hook back to the chain keeps the hook from snagging on materials, and using the weight of the chain, will drop the hook in front of you instead of allowing the hook to flip out and catch you in the head. Then go to the other side: do the same thing on this side and pull the chains that you undid from the first side. Return to the 1st side and pull the chains or staps that you undid from the 2nd side. You're done.

Whether securing or unsecuring chains or straps, if you control the hook, you control the chain or strap. Work with short pieces of chain or strap. Leave your excess to the outside of the rub rail. The more that you find yourself pulling a chain or strap through a rub rail, the more time you are wasting. If you are working with a trainer, look at his work patterns. (ALSO SEE INJURY PREVENTION IN THIS HANDOUT)

TARPING

TARPING THE LOAD

A load requiring tarps must be tarped at the shipper's and must remain tarped until the consignee is ready to begin the off-loading process. Do frequent load checks while enroute to make sure the cargo is protected from the elements. If the paperwork states that the load must be tarped, then you must tarp the load, regardless of any advice that you receive to the contrary. Common sense must be used. All loads of building materials, rust prone steel, glass, paper goods, weather sensitive metals, delicate equipment, or any other item that needs protection from weather and wind blown debris should be tarped.

In a flatbed operation, the driver may need to cover the cargo after securing the load. Some cargo must be protected from weather, and covering the cargo protects the public from falling or blowing cargo. Steel and other metal cargo is highly corrosive and will be ruined by weather if the covering is not in place. In some cases even the smoke from our stacks can cause the deterioration on certain elements. Drivers failing to cover the load will be responsible for damage to the cargo or public. Administrative action by law enforcement due to lack of covering on blowing cargo becomes the driver's responsibility. To install a tarp, roll the rear tarp into position first. Temporarily secure it in place with the tarp straps or ropes. When tarping a flatbed, any required folding should be done towards the rear of the trailer. Next, roll the front tarp on top of the load. The front edge should be flush with the deck if at all possible to prevent billowing. Secure the front edge with the bungees or rope. The rear end of the front tarp should overlap the front edge of the rear tarp. This will prevent wind billowing beneath the tarp. Secure the tarp snugly in place with all necessary rubber bungees or rope.

Stop immediately if the tarp flaps or balloons. Resecure the tarp. If left unsecured, the tarp may sustain severe damage. Severe tarp damage may result in disciplinary action or charge to the driver. To protect odd size machinery, drivers may have to wrap the entire machine in one or more tarps. Secure the tarp around the piece of machinery with straps or ropes. After removing the load, fold, roll, and store the tarp properly.

The tarp must be cared for at all times. Inspect it for any damage or tears due to sharp objects. Provide adequate edge padding and keep the tarp clean. Tarp damage should be reported when going through inspection at the Tulsa terminal. Proper care and maintenance of the tarps will benefit the driver and customer. Damaged or ruined tarps resulting from driver negligence will be charged to the driver.

Tarps will give you the best workout of your life. They are heavy and awkward. The wind can catch them and throw you. They get wet, stiff and frozen.

But, if you handle them right, you can make them work for you instead of against you.

Tarps are used to keep weather, road film and debris, and the smoke from our stacks from damaging cargo and in some cases to help hold loads together, actually using the tarps as a securement device. You will probably pick up a load someday of material that has been sitting out in a mud field exposed to all the elements and you will be told to tarp it. When you get to the other end the consignee will throw it in another mud field. Why did we tarp? To keep road film and debris from spraying into the materials, or to keep the chemicals in our smoke from destroying elements within the materials. It is one thing to have cargo sitting in one place and it is another to have the wind whipping salt, oil film, or dirt particles into it.

The #1 cause of cargo claims on the flatbed fleet are wet loads. Loads requiring tarps are of vast commodities. However, some of the most common loads that cannot be exposed to the elements are wood products, aluminum, coils, glass, and machinery. This by no means covers all loads requiring tarps. Cargo claims resulting from wet loads are usually the results of untarping at consignee's outside before they are ready to unload, moving the loaded trailer at the shipper's before tarping, not tarping at all, a poor tarp job, or using tarps that have tears and holes. Arrow has a standing policy which states that any load you haul that common sense would even suggest that it would be damaged if it got wet, you are to tarp the load. ***Rolls of plastic are available for issue in Tulsa and may be bought while on the road for use under your tarps.***

Tarping is a part of flatbedding. Make up your mind now that every load has to be tarped. That way you'll be pleasantly surprised when a load doesn't require tarping, instead of getting frustrated when they do have to be.

One of the greatest areas of cargo claims effecting our customer service in the Flatbed division is tarping. There are three common situations that arise:

1. Tarping a load with tarps that have holes in them.

Inspect your tarps frequently. Use Padding on sharp corners or protrusions of the cargo to protect your tarps. Replace damaged tarps as soon as possible.

2. Moving through inclement weather conditions while still at the shipper before tarping.

Anytime a customer instructs you to move your load outside before tarping in inclement weather have the customer sign a statement on your waybill indicating that he is instructing you to move untarped. The same applies to untarping outside before the consignee is ready to unload.

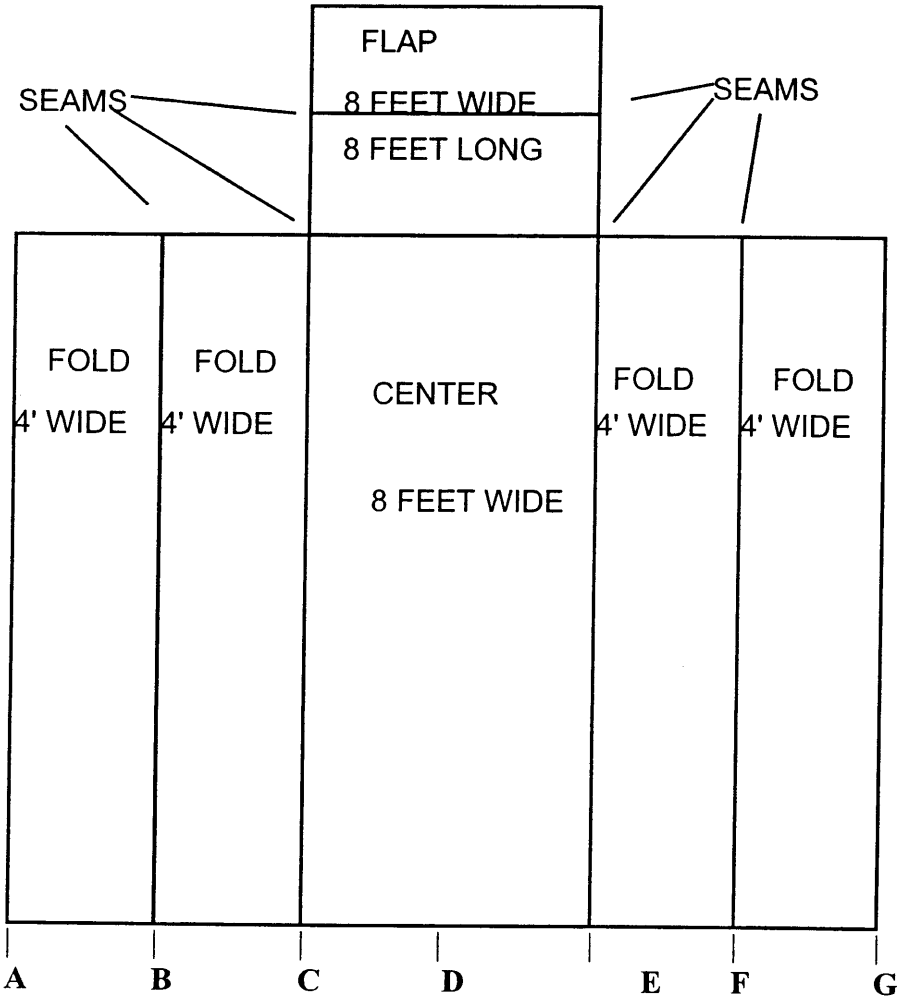
3.Leaving a tarped load untarped between multiple drops.

Retarping between multiple drops takes time. Take the time. Resecure your tarps to protect the cargo even if moving just a few miles.

USE PLASTIC UNDER YOUR TARPS!!!

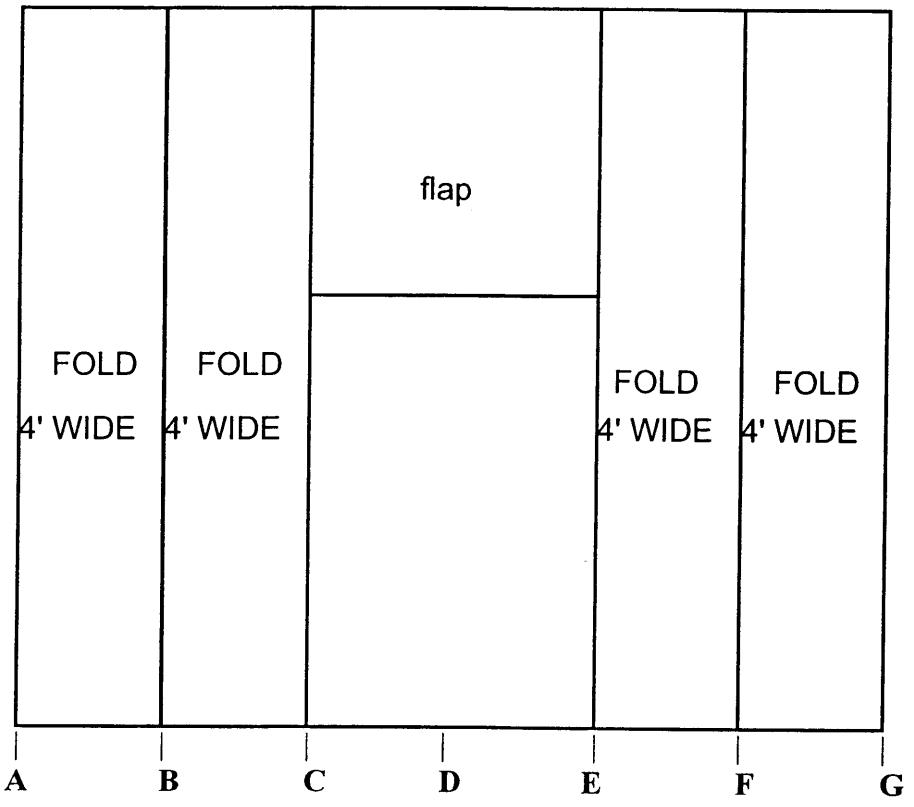
USE PADDING ON SHARP EDGES TO KEEP YOUR TARPS FROM BEING TORN!!!!

There are dangers working with tarps that we mentioned in Personal Injuries, so here we will look at being able to fold tarps and tarping a load.

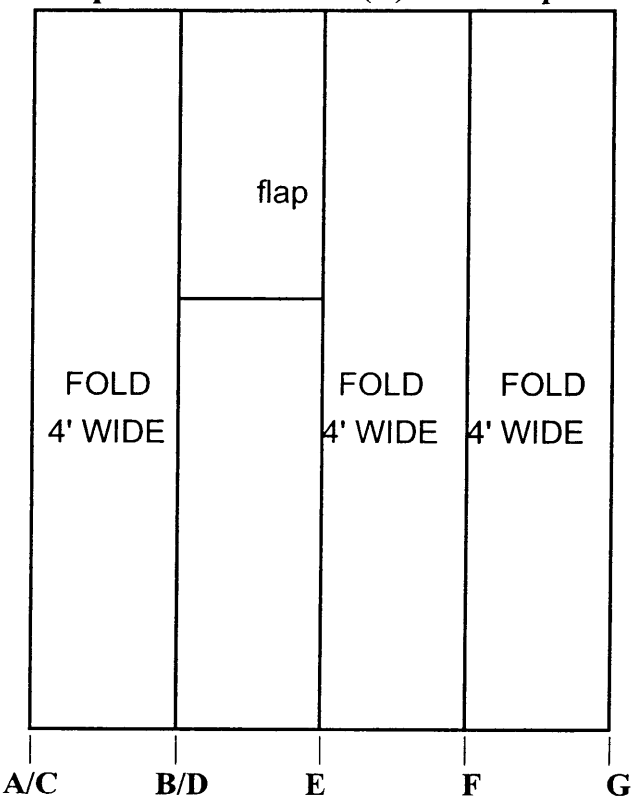


The outside of the tarp should be facing up, with the inside of the tarp to the ground.

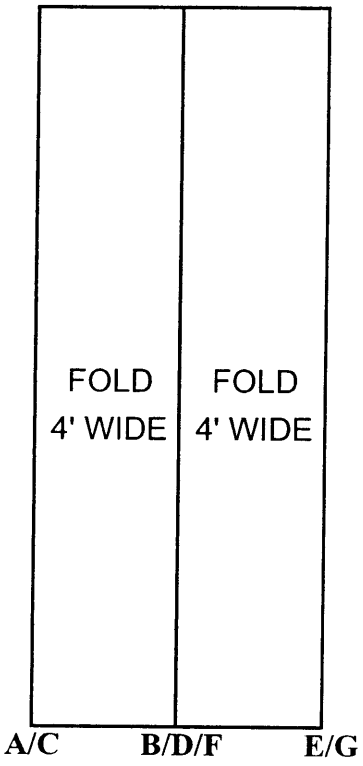
First, take the flap of the tarp and fold it back onto the center section of the tarp.



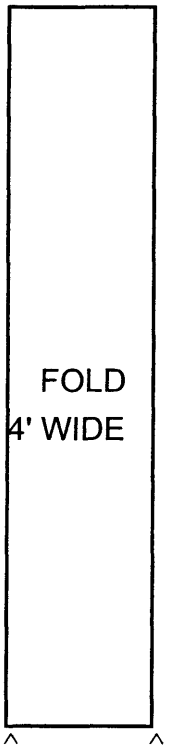
Second, take seam B and pull it to the center (D) of the tarp.



Third, take seam F and pull it to the center (D) of the tarp. (Notice that the flap is now covered by the side folds)

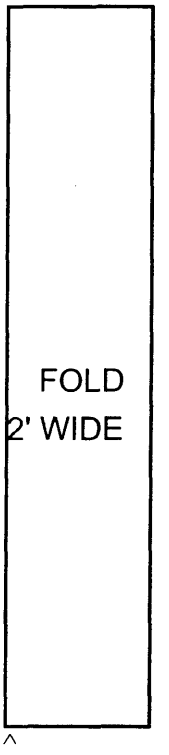


Fourth, fold one full side over the other.



A/C/E/G B/D/F

Fifth, fold in half again.



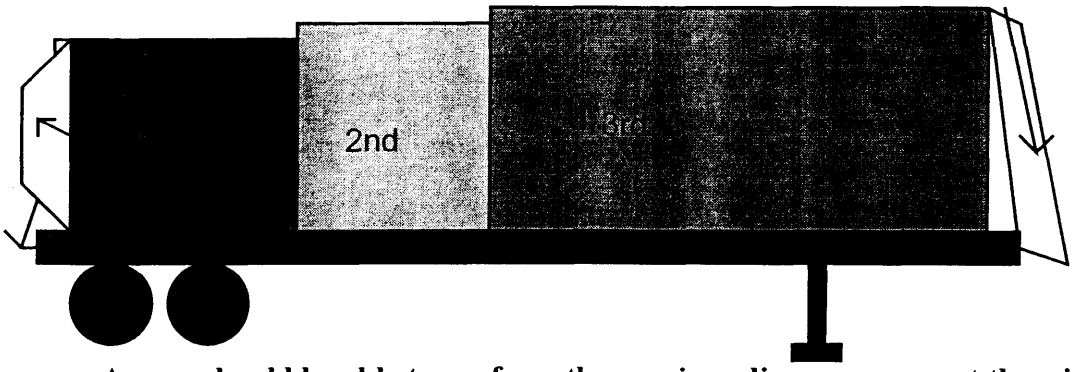
A/C/E/G/B/D/F

Sixth, drag the end of the tarp (the one that does not have the flap folded up inside it) so that it overlaps the rest of the tarp by about a third.

Seventh, stomp all the air out of the tarp and roll the tarp up starting from the end that you just folded over. This way the end with the flap enclosed in it will be to the outside of the roll. When you go to unroll it you will be able to place the tarp at the edge of the cargo where the flap will then drop down to cover the front or back of the cargo.

the rear flap should be tucked under the sides that are pulled the back

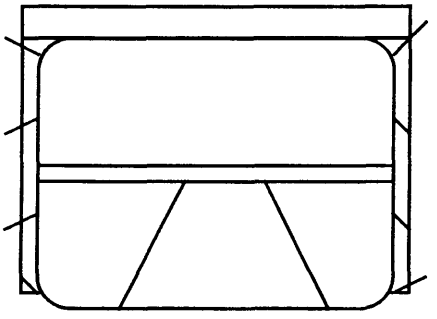
front end flap should go over the the sides that are pulled across

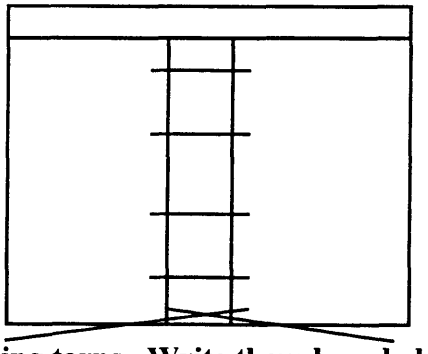


As you should be able to see from the previous diagram we want the wind to flow over the tarps. This means always starting with the rear tarp and working forward so that the front tarp overlaps the rear tarp. This keeps the wind from blowing under exposed edges of the tarps and billowing the tarps out like a kite.

FRONT FLAP

REAR FLAP





Drivers have numerous tricks for handling tarps. Write them here below. Such as:

- **In winter, wrap your tarps in a small tarp or trash bag before putting them away.**
- **Never stand on top and near the edge when pulling on your tarps to straighten them out.**
- **Carry a package of disposable diapers (carpet, rubber, innertubing, etc) with you to secure to the sharp edges of the cargo to keep it from tearing your tarps.**
- **Always unroll your tarps ahead of you when on top of a load. Never walk backwards with them.**

WEIGHT DISTRIBUTION/PLACEMENT

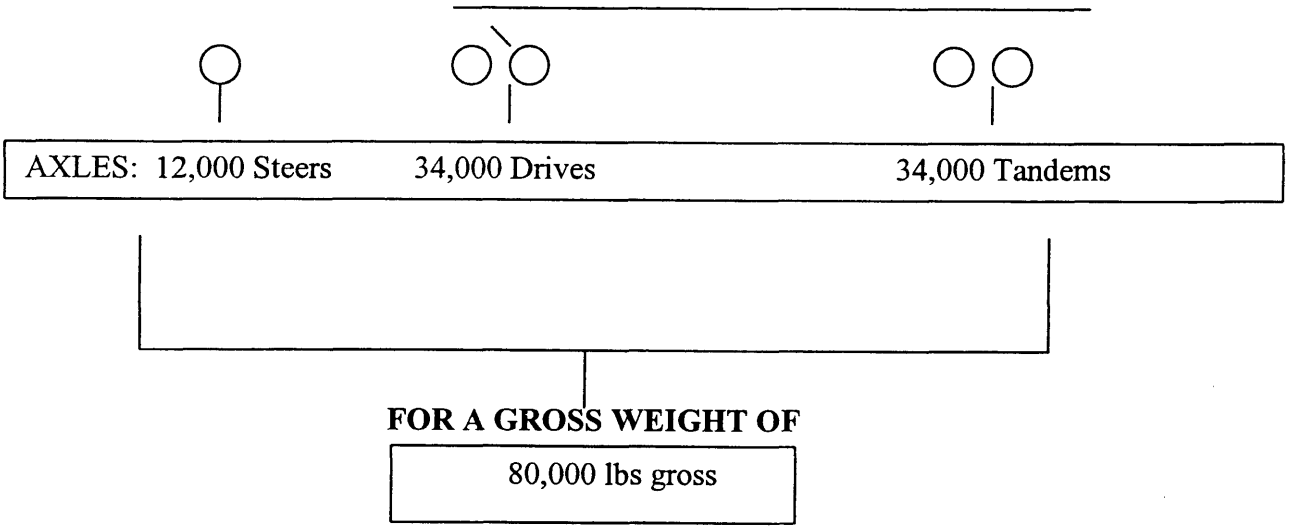
Cargo Weight Displacement

Always get a *tare weight* (empty weight) when you first get your truck. Knowing what your tractor and trailer weighs empty allows you to know how much cargo weight your vehicle can carry.

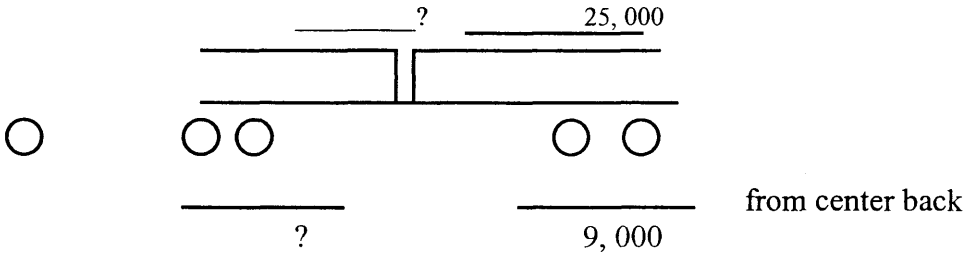
Average Flatbeds weigh	**31, 000 to 32,000**
Average Vans weigh	**32, 000 to 34,000**

If your tare is 32,000 lbs gross,
and your cargo weighs 48,000 lbs,
then your total gross weight is:_____?

The legal limits for your vehicle are:

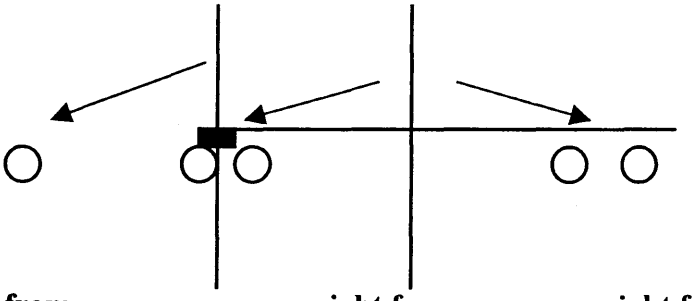


This only talks about gross weight, you also need to know what your empty axle weights are, so that you can decide where to place, or how to distribute the weight, of the cargo on your vehicle.



Note that the weight goes to axles from center of trailer, if your tandem empty weight is 9,000 lbs then you can put 25, 000 lbs of cargo on that set of tandems to equal 34, 000lbs.

Where does the weight of the cargo fall?



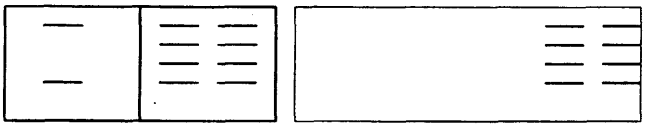
weight from @ the 5th wheel forward goes to the steers

weight from @ the center of the trailer forward goes to the drives

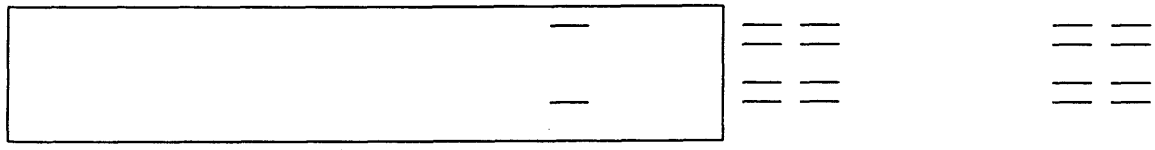
weight from @ the center to the rear goes on the tandems

SCALES

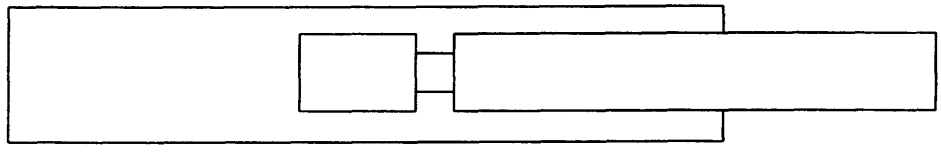
There are different types of scales you can way on. The most common nowadays is the gross/axle scales where your steer tires are on one platform, the drives on another and the tandems on a third. This type will give both the axle weights and the gross in one shot.



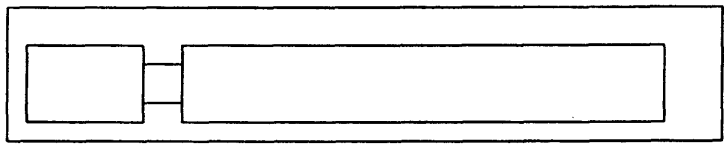
A second type is the full platform scale. Here you have to do some figuring. First, drive your steer axle onto the scale. *Go forward until your drives are NOT quite on the scale.* This will give you your steer axle weight



Then pull your whole tractor on the scale, about up until the middle light on your trailer is on the edge of the scale. This will give you the steers and drives together.



Then pul the whole tractor and trailer on the scale for your gross weight.



You should now have:

STEERS
STEERS AND DRIVES
GROSS

But! What you need is:

STEERS
DRIVES
TANDEMS
GROSS

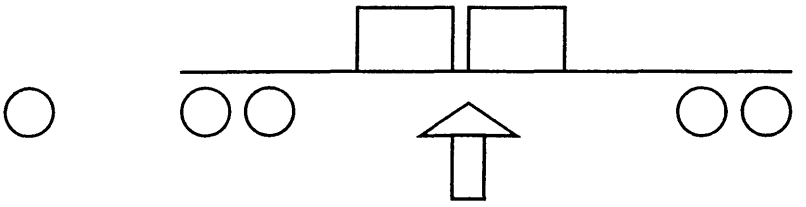
OK, you've got your Steer axle. To get the drives: subtract the steers from the steers and drives. To get the tandems subtract the steers and drives from the gross.

Steers and drives
- Steers
= Drives

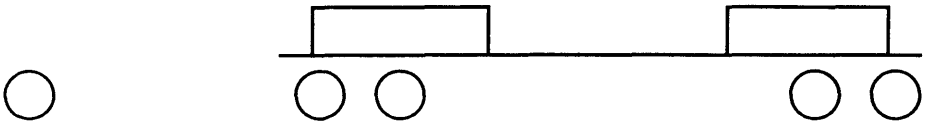
Gross
- Steers and drives
= Tandems

Loading from the center

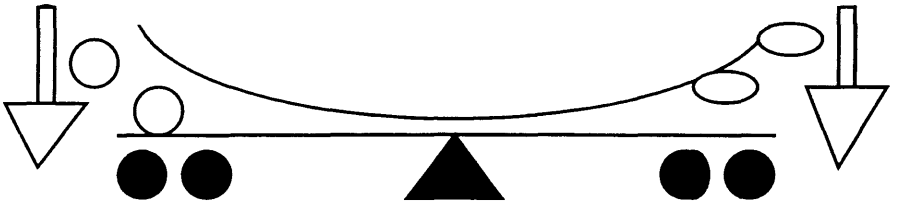
If you load as shown in the next figure, you cannot tell exactly which axle center the weight is going to fall on because the center point of the trailer is an approximation. You have a very hard time controlling whether the cargo weight will be distributed evenly on the drives and on the tandems.



By separating the pieces, the front one about a foot or so in from the front of the trailer and the second piece in about a foot or so from the rear of the trailer. You may leave an empty space in the middle, but you will have control over where the weight falls.



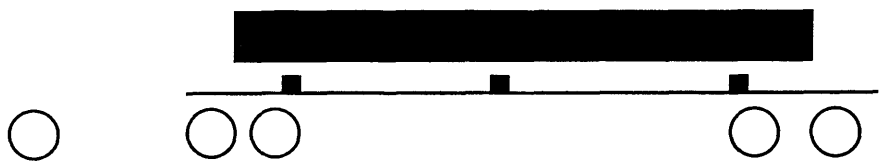
The basic concept is this: What will it take to flatten out the circle over the center of balance?



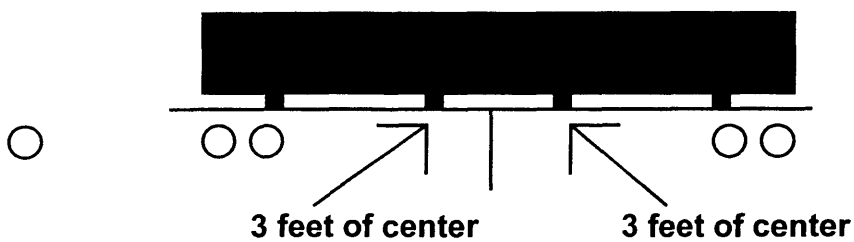
Dunnage - wood (4x4) used to block, brace, or support cargo. It:

- **displaces weight**
- **removes vibration**
- **assists the forklift in getting under pieces of cargo**

Where does center weight fall in the next figure when three 4x4's (dunnage) are used?



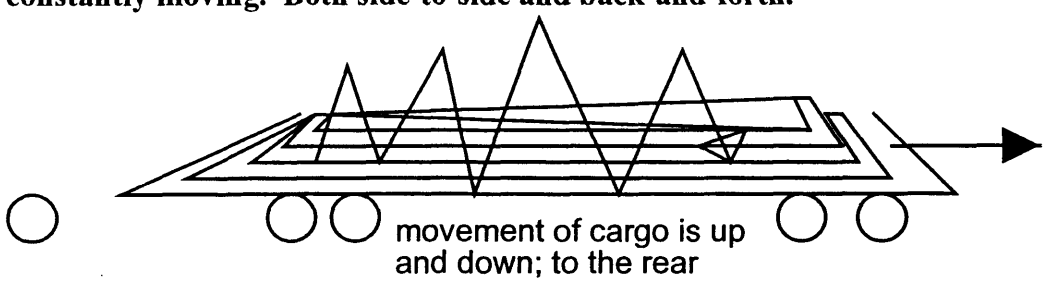
Note that 4 pieces of dunnage are needed for controllable axle weight distribution. see the next figure.



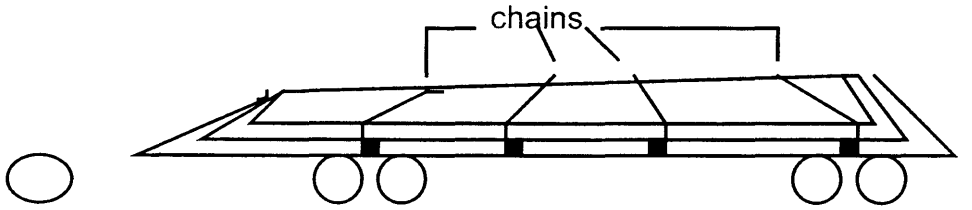
How do you determine where to place the dunnage? Walk out the length of the trailer. If it's 20 paces, then come back 10 paces and that's the center. Throw the weight evenly. Note: count the number of spindles on a side of the trailer against the length of the trailer. How far is it between spindles.

Road Vibration

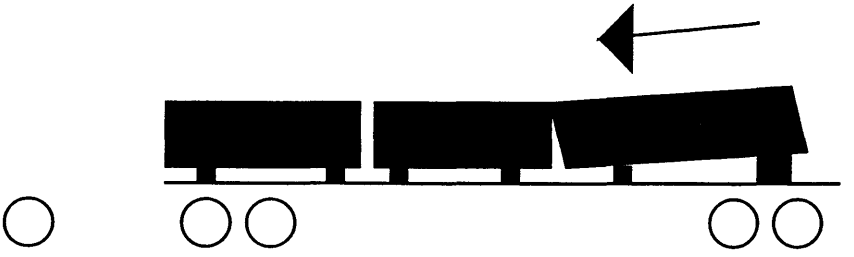
Drivers need to be aware that as they move down the road that their cargo is constantly moving. Both side-to-side and back-and-forth.



This motion can be controlled or used to your advantage to control your cargo by intelligent placement of your dunnage. Example: plate steel weighing 48,000lbs The tendency is for cargo to move towards the rear. In the next figure placing 4 pieces of dunnage reduces road vibration to 4 points. Chain these points.

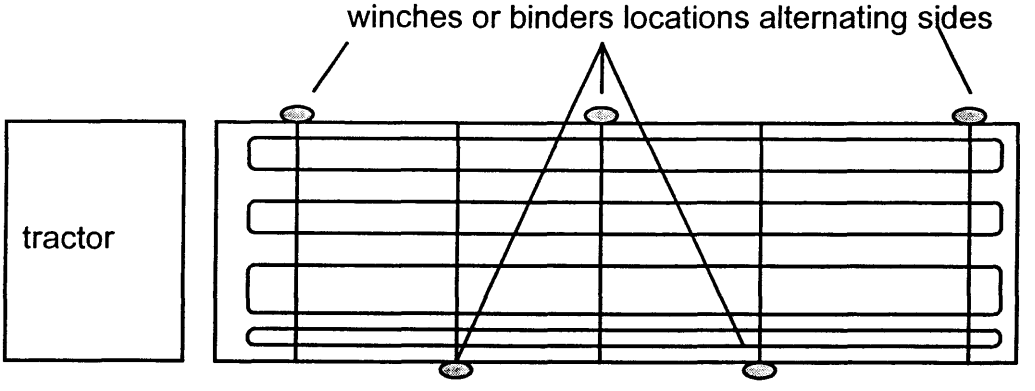


Another example of using dunnage to your advantage is on a lumber load. This load has a natural downslope (angle) to the rear. Put a larger piece of dunnage underneath last edge to prevent the rearward movement. (use 2x4's under lumber put 4x4 under rear bundle)

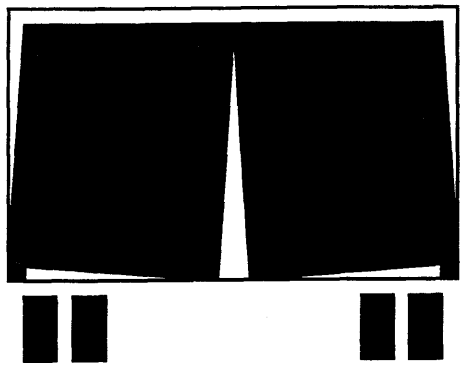


Always alternate sides with your securement devices when loading.

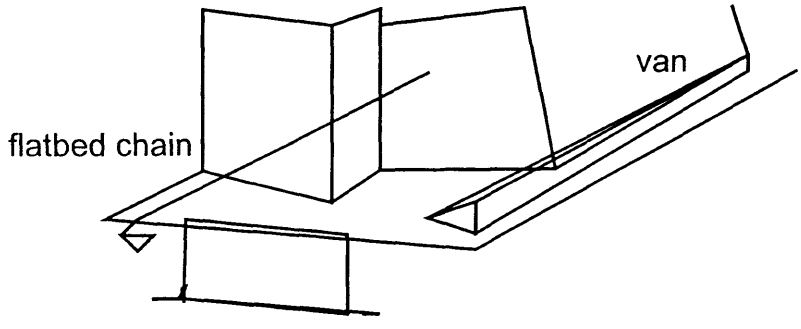
top view of trailer



One of our contracts out of Wyoming is mud (I always wanted to say that). This load is palletized bags of earth or pillow bags. When first loaded and tarped this load looks great. The tarps look sharp-edged and clean. But as you move down the road the edges round off. They are very similar to palletized van loads. See the next figure.



With the road vibration the tendency is for the bags to move to the outside from the top. To compensate for this on a Flatbed run a chain along the outside edge under the pallets or a 1x4 will create the same affect. See the next figure.



Making road vibration work for us by using dunnage correctly. Taking care at the shipper saves time and money on the other end at the delivery to the consignee.

Remember:

Arrow has to run 100 loads for every one claim.

EACH ARROW INSURANCE CLAIM HAS A $25,000 DEDUCTIBLE.

IF YOU HAVE A LOAD PROBLEM .... CALL IN .... YOU CAN REACH THE TRAINING DEPARTMENT AT 1-800-756-3003 EXT 2256.

WEIGH EVERY LOAD

CARGO LOADING PRINCIPLES

There are two (2) basic principles that apply:

- Do not overload the vehicle.
- Distribute the weight properly on the tractor and trailer.

Avoid overloading The Vehicle. The GVW (Gross Vehicle Weight), the total weight of the vehicle and cargo, should not exceed the limits set by State and Federal Laws.

AXLE WEIGHT

Axle weight is the amount of weight transmitted to the ground by one (1) axle or tandem on a tractor or trailer. State laws determine this rating. When driving through a state weigh station, the inspectors will check the GVW and the weight per axle to assure compliance with the legal weight.

PROPER DISTRIBUTION OF WEIGHT

The distribution of weight on the tractor and trailer determines the capacity of any of the vehicle's axles. The load should be evenly distributed on the trailer to minimize the need for adjustment of weight after loading the trailer. Remember the key points about loading.

- Divide the load evenly in the back and front of the trailer. Put roughly half the load up front and half in back.
- Spread it evenly on the floor to prevent shifting
- Arrange the load to keep axle weight within legal limits. Trailers with sliding tandems: tandems to the rear position puts more weight on the tractor rear axle. Tandems in the forward position puts more weight on the rear of the trailer.
- Keep the center of gravity as low as possible. A high center of gravity makes the vehicle more dangerous to handle, especially on curves and hills. Keep it low by avoiding concentration of the load on one point of the trailer. Make sure heavy good are on the bottom and distribute partial loads among the axles.

BRIDGE LAW

Federal bridge law provides a standard to control spacing on truck axles crossing highway bridges. The driver must ensure the vehicle meets this standard. There are three (3) ways that the combination of axles must be legal. (See map following)

Distance between front and rear axles of the tractor

This concerns the tractor axles of the tractor determines the maximum weight that the tractor can weigh. On a three (3) axle tractor, the steer axle can only carry 12,000 pounds and the driver axles support 34,000 pounds for a total of 46,000 pounds of loaded tractor weight. In order to carry this much weight legally, the minimum distance between the front and rear most axle of the tractor cannot be less than thirteen and on half (13½) feet

Distance between steer axle and rear most trailer axle

The second group of axles to consider is the distance between the steer axle and the rear most trailer axle. In order to carry 80,000 pounds GVW, the minimum distance cannot be less than fifty one (51) feet between them. Legal GVW declines by five hundred (500) pounds per foot as the measured distance declines.

Distance between forward most drive axle of the tractor and rear most trailer axle

The third group of axles to make legal are the forward most driver axle of the tractor and the rear most trailer axle. The minimum distance necessary to carry 80,000 pounds GVW on a highway bridge is thirty two (32) feet. To determine this value, each set of tandems may carry 34,000 pounds, which totals 68,000 pounds. Look at a bridge law table for four (4) axles, find 68,000 pounds and then read the length required. If the vehicle meets all of the above specifications, it is ready to go to the road. If not, then the driver must adjust the axles, load, of fifth wheel slides to bring the weight into proper legal tolerances.

Transfer weight to the steer axles by sliding the fifth wheel. Each fifth wheel position moves a certain weight between the drivers and the steer axle. This value varies with the style of fifth wheel. To continue the above illustration, say each position transfers five hundred (500) pounds. Move three (3) positions (1500÷500=3) to move 1500 pounds. Unlock the fifth wheel slide lock. Dolly down the trailer. Place the tractor in reverse and back under the trailer three (3) positions (placing a spike or block in the notch three positions from the outer edge of the fifth wheel will position the locking pins three notches from its current position and will keep you from going past the notch you want to end up in).

Always lock the trailer brakes during this procedure to prevent rolling.

Transfer weight to trailer tandems by sliding the trailer tandem. Each position on the slider transfers a varying amount of weight. To continue the above illustration, say it transfers five hundred (500) pounds. Move three (3) positions (1500÷500=3) to move 1500 pounds. Lock the fifth wheel slide lock in place. Release the trailer tandem slider lock. Transfer the weight to the rear by moving the slider three (3) holes forward of its present position (you can use a locking bar three holes from the leading edge of the tandem slide, this will keep you from going past the hole you want). Raise the landing gear dolly. SET THE TRAILER BRAKES. Back up to shorten the distance between the tandems by three (3) holes. Lock the slider after adjusting the weight. Return switches to

normal inside the cab and reweigh the vehicle. Make any other necessary adjustments. State weigh stations use a variety of scales. Drivers must go through a scale if it is open. Many states have empty and loaded lanes. Drive through the appropriate lane and watch the lights when entering the scale. Several states use weigh in motion scales. The driver weighs the unit while moving at a slow speed. The speed will be posted at the scale house weigh lanes. A driver must not speed or stop unless given the "red light." The driver will then stop and await further directions. Some use split drive axle scales. There is a center line on each scale. Position the drivers, one on each scale, and stop. If the weight is correct, the driver will get a green light unless they want further information or see a safety violation on the unit. There are serious consequences to overloading, including fines and safety problems.

On a spread axle trailer where the axles of the trailer are 8' apart you are allowed 20,000 lbs on each axle for a total of 40,000 lbs. However, you are still only allowed a total gross of 80,000 lbs. The adjustment would be to have less weight on the steers and drives to compensate for the increased weight on the trailer axles.

FUEL MANAGEMENT

Diesel fuel weighs approximately eight (8) pounds per gallon. Trucks carry an average of two hundred (200) gallons full fuel capacity. The weight of the fuel would be sixteen hundred (1600) pounds. The driver must allow for the weight of the fuel when making the tractor/trailer unit weight legal. A driver may carry additional weight at the expense of fuel capacity. Two hundred (200) gallons with an average of six (6) miles per gallon would give the driver a range of twelve hundred (1200) miles before refueling. Seventy two (72) gallons with the same six (6) miles per gallon would give the driver a total range of 432 miles. This is a major consideration when approaching the 80,000 pound GVW.

PERSONAL INJURIES

The main driver injuries come from three things:

- **falling/jumping from the trailer and/or load,**
- **getting smacked by the winch bar and/or bungees (and other equipment), and**
- **improper lifting of cargo and tarps.**

These injuries happen on both the flatbed side of the company and the Van side.

Injuries around the tractor

The simplest motions that we make every day result in injuries when we don't think. Many of our recent driver injuries have happened to both experienced and new drivers and as the experienced drivers have said, "I knew better...I should have....I just wasn't paying attention".

One motion that results in broken bones, back injuries, and recently head injuries is simply getting out of the tractor. How many times have you parked the truck, turned it off, opened the door and stepped out onto the step instead of turning around and climbing down the steps? You do it every day. This can kill you.

Your foot slips as you descend to the bottom step, a rock turns under your foot when you step to the ground, and your in the hospital losing time, money, and possibly ending your career. *Always use the 3 point stance getting up into and down out of the cab.*

There is an even simpler way to think of this: *Every time your feet leave the ground you are putting yourself at risk!* We climb up onto the tractor at the driver's door, to clean windshields and mirrors, to access our equipment behind the tractor, to access the front of a trailer often handling equipment at the same time. We step on the steps, the catwalk, the frame, and even the tires. We need to make sure that:

- **the areas we are going to step on are clear of ice, snow, equipment, and slick substances.**
- **use a 3 point hold or stance whenever climbing up or down from the vehicle.**
- **we don't allow ourselves to get hurried. Save the speed for the open road.**
- **ask ourselves where we can get hurt. Think of yourself as a 90 year old man with a walker, asking yourself where is this going to hurt you.**

Connecting, or disconnecting, your airlines and pigtail is a situation that can present its own dangers. When connecting the lines, start with the one furthest away from you and work towards you. Never stand over the lines where, if they pop loose, they can fly up and damage parts of your anatomy. This is even more important when disconnecting the lines. Start with the one closest to you and work line by line away from you. *Do not position yourself where you will get your feet*

tangled in the lines when connecting/disconnecting the lines or when getting gear off of the headache rack.

Injuries around the trailer

We can access the trailer from two points, the front and the rear. Jumping down from the trailer will ruin your knees. Again, with something turning under your feet you have the potential for broken ankles. In winter conditions, give the same attention to the DOT bumper that you give to clearing off your steps to the tractor.

Injuries with cargo

Lifting cargo, falling off loads already on the trailer contribute to some of the most severe injuries driver fall victim to. When lifting do not bend over, squat down and lift with your legs. Know the weight of what you are trying to lift and do not turn and twist while holding something heavy. Hold things close to the body instead of at the full reach of your arms.

When on top of loads be careful of your footing, especially when tarping a load.
Always unroll a tarp away from you. Do not walk backwards to unroll it.

Injuries with equipment

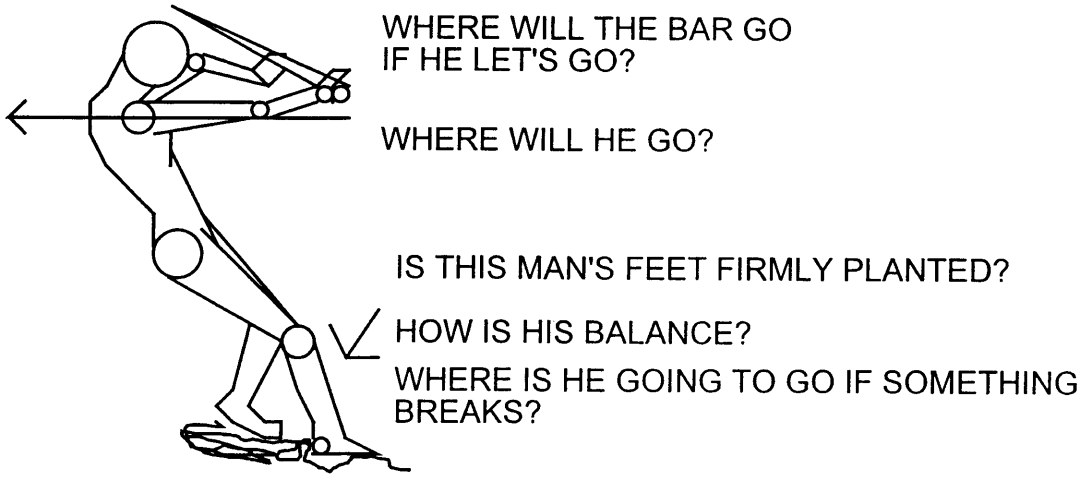
Let's take a look at the other cause of injuries mishandling the winch bar when tightening or releasing the binders and winches.

The winch bar can be several useful things to a driver. It can also be a deadly weapon, an unguided missile, a bone-breaker, a jaw breaker, a face smasher, a finger cutter, a back breaker. Keeping a few common sense rules in mind can keep the cheater bar working for you instead of endangering you.

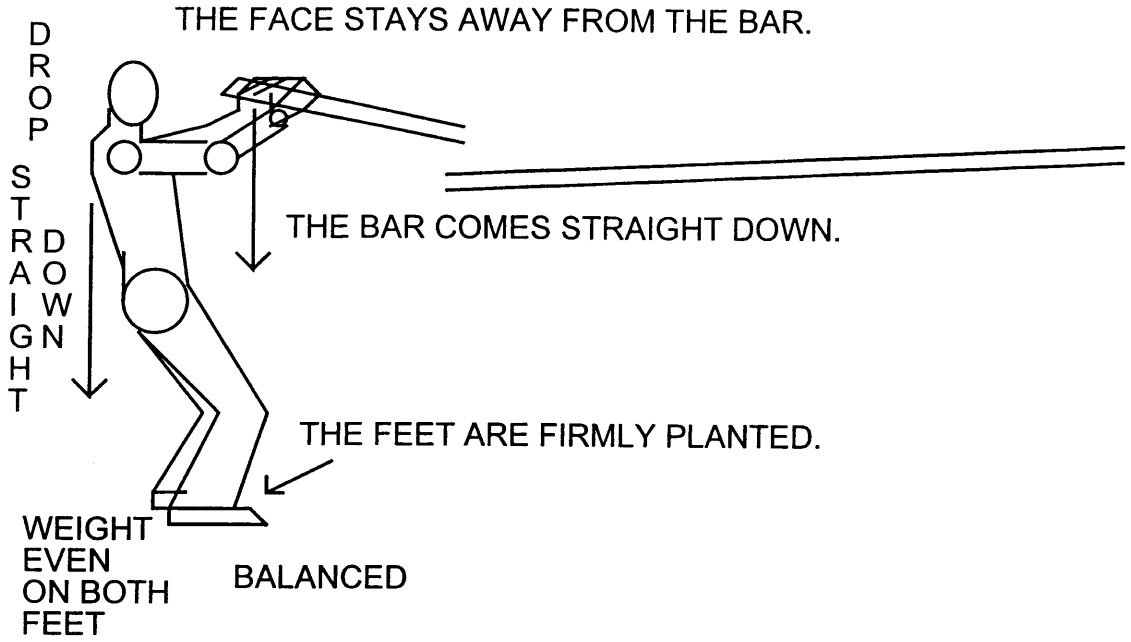
Stance

How you stand, What you stand on, Where the bar is going to go in relation to your body, all go in to determining your stance when tightening, or releasing, the securement devices. The constants that are important are:

- **Keep you feet firmly planted.**
- **Keep your weight balanced evenly on both feet.**
- **Keep your face out of the way of the bar.**

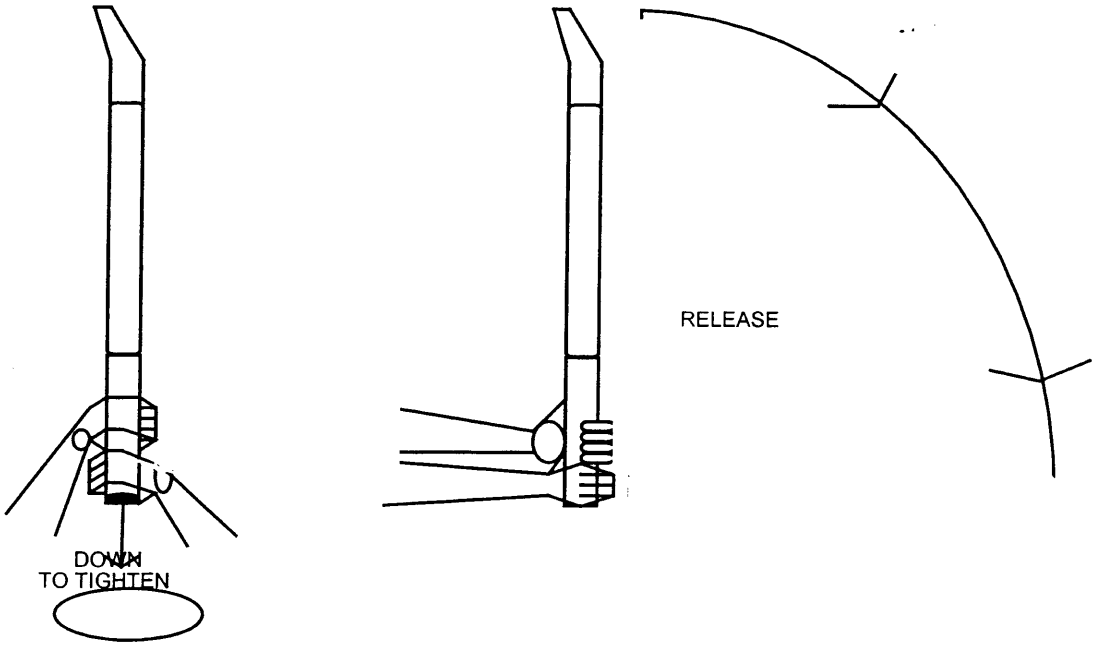


We need to think of these factors every time we handle a winch bar. We need to think of the risk to ourselves and others in the area. A winch bar can be thrown by the sudden release of tension in an opening binder. It can be thrown 30 to 40 feet with terrific force. Imagine that force hitting you in the face. Imagine that winch bar flying off and hitting someone else, or your cargo.



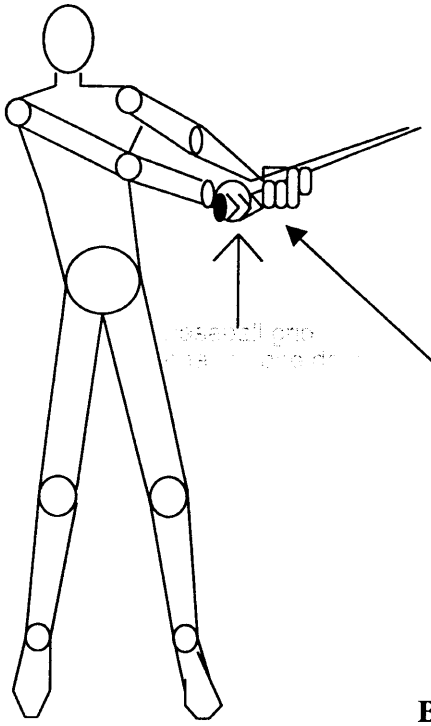
Handhold

How you grip the winch bar can impact internal body injuries such as tearing a muscle, damaging a shoulder joint (shoulder rotator cuff), or being stabbed/smacked by the bar. When tightening or releasing a binder on a chain, or a winch on a strap, hold the cheater bar the way you would grip a baseball bat (see the below figures). This allows you a firm grip and takes into consideration our other points of stance and body motion.

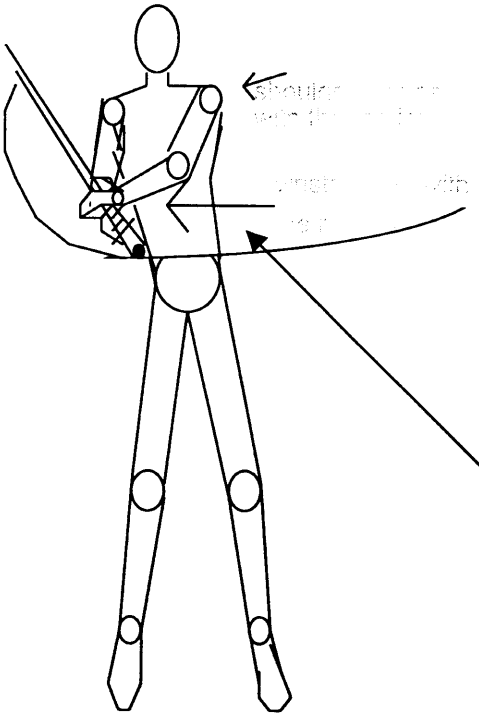


Body motions - working with the tool.

Which way will the bar swing with the tightening and the release of different securement devices? Your stance and your handhold determine how your body is going to move either with the movement of the bar or against it. Your body motion with the movement of the bar can cause injuries, or, if we're smart, minimize the risk of injury.

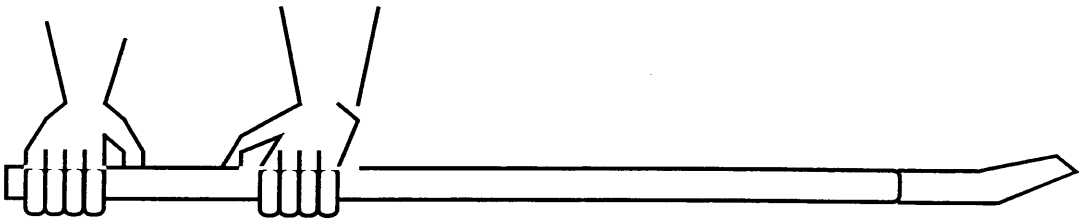


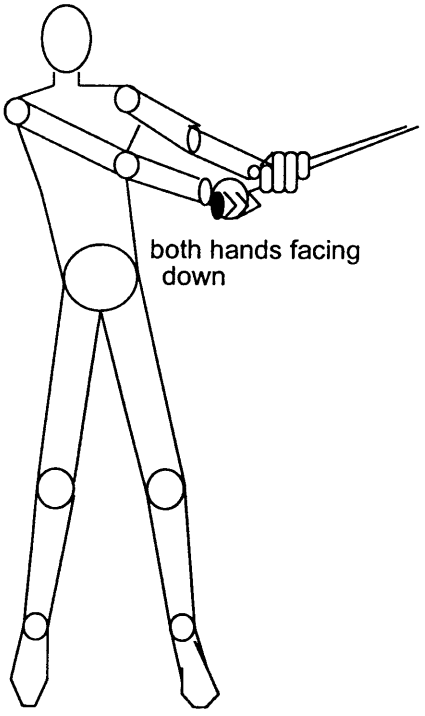
Baseball Grip (one hand up, one hand down)

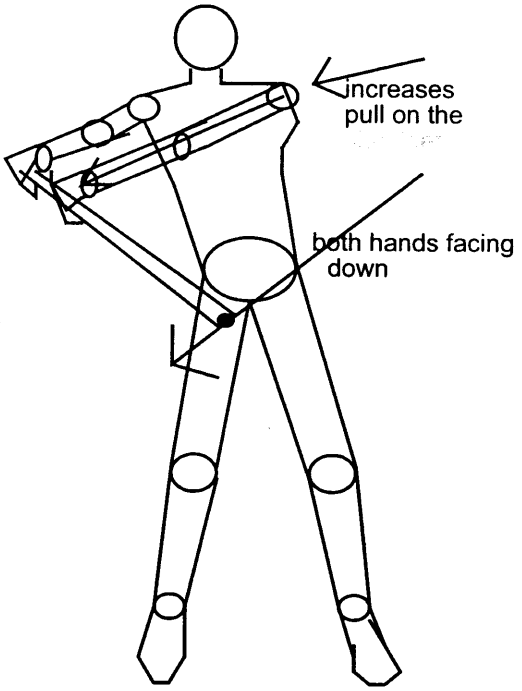


Shoulder and wrists move with the motion!

With both hands grabbing the bar in the same direction there is the possibility of injury to the rotator cuff of the shoulder.







LOAD SECUREMENT 2000+

VAN DIVISION

Pointed Towards Excellence

ArrowTrucking

Safety is Everyone's Business!!

Receipt

I hereby acknowledge the receipt of the Van Division Load Securement packet on

_____

Month Day Year

I further acknowledge that I will read this packet, and that I am required to use this guide when securing loads for the Van Division.

_____

Signature

_____

Print Name

_____

Date

!!!! Alert !!!!

There are 4 main CARGO ISSUES in the Van Division. They are:

Coils, Glass Loads, castorized (wheeled mechanisms) items, and shortages !

Please refer to pages 23 through 27 for coil load securement instructions.

Please refer to pages 28 through 31 for glass load securement.

Please refer to pages 32 through 38 for castorized loads securement.

Please refer to page 39 for use of cargo seals and instructions on shipper's load and count.

ONLY YOU, THE DRIVER, CAN STOP THESE LOSSES.

VAN LOAD SECUREMENT 2000+

The Van Division accounts for about a quarter of all Arrow trucks. The growth of that division has been such that they have separate requirements from the flatbed division. While you need to refer to the Driver Manual for Van Division specifics, here are some basic points you need to be aware of.

Before Loading
Always walk to the front of the trailer to ensure:

- **that all nails have been pulled from the floor.**
- **that the vent in the front of the trailer is closed.**
- **that the tie-downs are " lying down " in their recesses properly.**
- **that the ceiling and walls have no holes in them.**
- **to sweep and/or pickup all debris.**

After You Unload
Follow the same procedures as above.

Before You Drop a Trailer
Follow the same procedures and:

- **check all the trailer lights.**
- **check the tires.**
- **slide the trailer tandems all the way to the rear (if you are dropping an empty)**
- **notify the shop or dispatch if there is anything wrong with the trailer.**

Procedures to follow during and after loading.

- **Count the items being loaded into your trailer.**
- **Check the cargo for damage.**
- **Make sure that your vents are closed (unless you are hauling cargo that**
- **requires them to be open).**
- **Make sure the forklift driver does not damage the roof of the trailer.**
- **Be sure the count on the paperwork you sign is the same number of**
- **pieces you counted. Unless you are positive on the count, you must**
- **write SHIPPER LOAD AND COUNT (SL&C) on the paperwork.**
- **Do not under any circumstances argue with a customer. If there is a**
- **problem, CALL YOUR DISPATCHER OR MONITOR.**
- **Secure the load properly. Do not move until you have your load locks**
- **in place. You may add other securement after you move from the dock,**
- **but be sure it is safe to move even a short distance.**
- **Before pulling away from the dock, check each side of your trailer for**
- **sufficient clearance. Remember that when your doors are open your**
- **trailer is 10 feet wide.**
- **Be sure your doors are tightly secured to the trailer with the chains**
- **when your doors are open. Using bungees will pull the doors in tighter**
- **to the sides of the trailer and prevent them from flopping loose.**
- **Find a scale as close to the shipper as you can. Weigh every load**
- **Do not leave the immediate area if you are overweight. Call dispatch**
- **and/or your supervisor as soon as possible.**

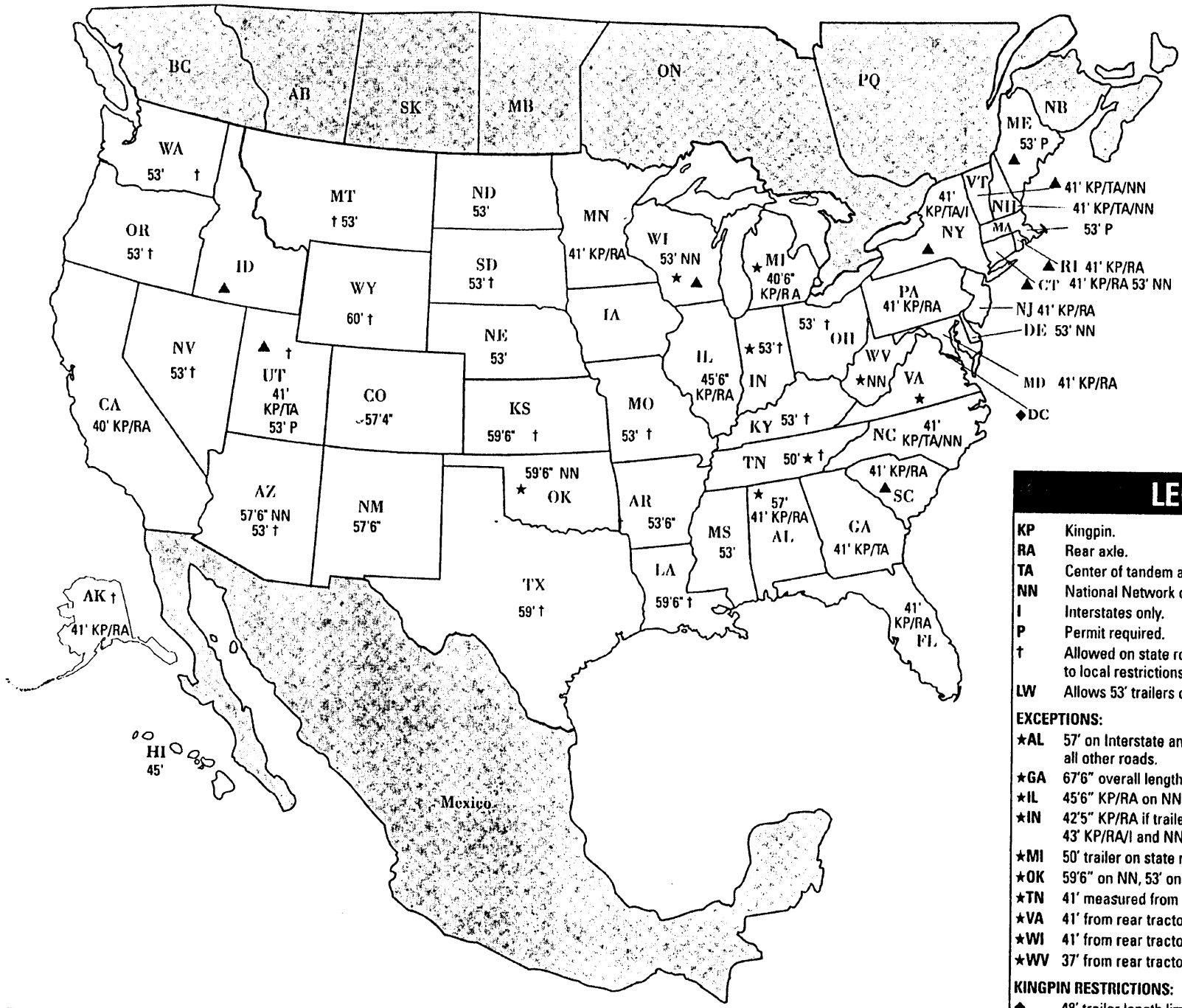
53' Trailers

- **53' trailers are very long. You must allow extra swing clearance for the rear overhang. This is the portion of the trailer the extends beyond the rear axle of the trailer.**
  When pulling out of a parking spot or dock, you must pull as far forward as you can
  before starting your turn. ***That back tail swing will hit a vehicle on the side you are***
  turning away from **if all you do is concentrate on your tandems.**
- **You will also need to allow extra room when you are changing lanes or passing.**
- **Inside the trailer:**
  - **There is a line painted in the rear of each 53' trailer. The line is painted at the 48' mark measured from the front of the trailer.** ***Never load freight beyond this line*** **unless it**
    is freight that is very light such as aluminum cans, insulation, pillows.
  - **There are extra horizontal rows of e-tracks along the last 20' of a 53' trailer. This is so that you can use your e-channel straps to secure your cargo so that it does not fall backward.**
  - **Your trailer is 13'6" high. If you are not sure of your clearance on an overhead, get out and look.**

The tandems do not slide all the way to the rear of the trailer. The distance between the trailer tandem and the kingpin of the trailer is regulated by several states. There are markings on the 53' trailers at the 40' and 41' marks to help you identify where you need to set your tandems for different states. However, not all of the trailers have them. Get yourself a 50' tape measure.

Kingpin Settings for 53' Trailers

States	Maximum Kingpin Settings
California	40' from kingpin to center of rear axle
Connecticut	41' from kingpin to center of rear tandem
Florida	41' from kingpin to center of rear tandem
Georgia	41' from kingpin to center of rear tandem
Illinois	42'6" from kingpin to center of rear axle
Indiana	40'6" from kingpin to center of rear axle
Iowa	40' from kingpin to center of rear axle
Maine	43' from kingpin to center of rear axle
Maryland	41' from kingpin to center of rear tandem
Michigan	40'6" from kingpin to center of tandem + 1to 5"
Minnesota	41' from kingpin to center of rear tandem
New Hampshire	41' from kingpin to center of rear tandem
New Jersey	41' from kingpin to center of rear tandem
New York	41' from kingpin to center of rear tandem
North Carolina	41' from kingpin to center of rear tandem
Rhode Island	41' from kingpin to center of rear tandem
South Carolina	41' from kingpin to center of rear tandem
Tennessee	41' from kingpin to center of rear tandem
Utah	40'6" from kingpin to center or rear tandem
Vermont	41' from kingpin to center of rear tandem
Virginia	37' from the last tractor axle to the first trailer axle
West Virginia	37' from the last tractor axle to the first trailer axle
Wisconsin	41' from kingpin to center of rear tandem



TIP
A GE Capital Company

LEGEND

KP	Kingpin.
RA	Rear axle.
TA	Center of tandem axle assembly.
NN	National Network of Designated Highways only.
I	Interstates only.
P	Permit required.
†	Allowed on state routes, but may be subject to local restrictions.
LW	Allows 53' trailers on roads with 11' lane widths.

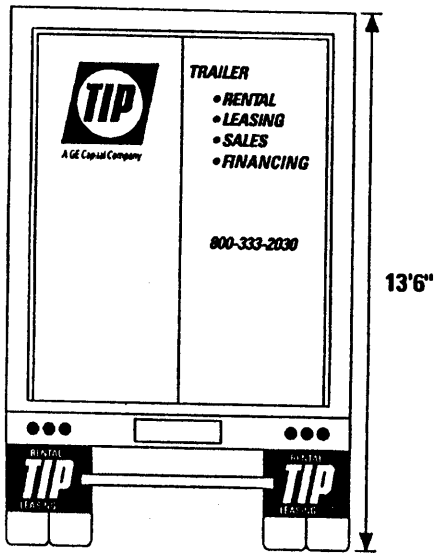
EXCEPTIONS:

★AL	57' on Interstate and designated highways, 53' on all other roads.
★GA	67'6" overall length limit.
★IL	45'6" KP/RA on NN; 42'6" KP/RA on all other roads.
★IN	42'5" KP/RA if trailer manufactured before 1/85; 43' KP/RA/I and NN only.
★MI	50' trailer on state routes.
★OK	59'6" on NN, 53' on all other roads.
★TN	41' measured from kingpin to rear of trailer.
★VA	41' from rear tractor axle to kingpin.
★WI	41' from rear tractor axle to kingpin.
★WV	37' from rear tractor axle to front semitrailer axle.

KINGPIN RESTRICTIONS:

◆	48' trailer length limit in effect.
▲	48' trailer length limit in effect off National Network.

Based on inform[illegible]on available as of 8/98. TIP assumes no liability for inaccuracies.
Consult appr[illegible]uthorities for current information. Information supplied by J.J. Keller & Associates, Inc.



Trailer height limitation is 13' 6" on all roads with the following exceptions:

Alaska	14'
Arizona	14' on designated systems; 13'6" elsewhere
California	14'
Colorado	14' on designated system; 13' 6" elsewhere
Hawaii	14'
Idaho	14'
Kansas	14'
Missouri	14' on designated system; 13' 6" elsewhere
Montana	14'
Nebraska	14' 6"
Nevada	14'
New Mexico	14'
North Dakota	14'
Oregon	14'
South Dakota	14'
Texas	14'
Utah	14'
Washington	14'
Wyoming	14'

Trailer width limitation is 102" on all roads with the following exceptions:

Alabama	102" permitted on Interstates and designated highways only; 96" width limitation on all other roads (generally lane widths less than 12')
Arizona	see Alabama
Connecticut	102.36" on all roads.
District of Columbia	see Alabama
Florida	see Alabama
Georgia	see Alabama
Hawaii	108" width limitation on all roads
Illinois	see Alabama
Kentucky	see Alabama
Louisiana	see Alabama
Maryland	see Alabama
Massachusetts	102" including safety devices permitted on other roads
Michigan	see Alabama
Missouri	see Alabama
New Jersey	see Alabama
North Carolina	see Alabama
Pennsylvania	102" permitted on all roads for trucks; combos permitted. 102" on Interstate or designated highways only, 96" on all other roads
West Virginia	see Alabama

Based on information available as of 8/98. TIP assumes no liability for inaccuracies. Consult appropriate authorities for current information. Information supplied by J.J. Keller & Associates, Inc.

Top 50 Customer Profile Van Division

r	Customer	Commodity	d lock	lock strap	floor staps	heav y	t trainin	notes of caution
#	Aaon	Parts	X	X				advised to eliminate possible movement of cargo.
#	ABB	Transformers		X	X			movement. Large Transformers require securement with floor straps and E-lock straps.
#	Advanced Elastomer	Advanced Elastomer	X	X				Palletized load. May be double stacked and therefore top heavy.
#	AFG Ind	racks.					X	tipping forward or to the side. Check with Training
#	Alcoa Aluminum	Coils			X	X	X	Very dangerous. Each pallet must be blocked extensively. Every strap in truck must be used. Contact Tammy, Kirk or Gary if a problem.
#	American Manufacturing	Reels of Cable		X	X		X	Must be blocked securely. Floor straps must be used to prevent forward rolling of reels. Very Dangerous. Securement is very important. Be careful!
#	American Premier	Bagged dirt or massonry sup.					X	load securement on this load is minimal contact training should you have a problem
#	Arc South	Supplies						See notes on ESAB CO.
#	Ball Foster Glass	Glass Bottles				X		Cornering must be done carefully.
#	Boise Cascade	Lrg. rolls of paper				X		rearward movement of cargo. Very heavy max weight 80,000
#	Borg Compressed Steel	Scrap Metal						Minimum securement needed.
#	Criterion catalyst	Bags of Super Sacks				X		Easy load to haul. Minimum securement required. If double stacked very top heavy. Critical appointment times.
#	ESAB	Welding Supplies		X	X			blocking movement of pallets. If straping over pallets use caution to avoid crushing boxes or rolls
#	Freeman Decorating	Supplies for Conventions	X	X				Minumum load securement requirements. Delivery and pick-up times are critical. Doors must be kept locked and sealed at all times.
#	General Aluminum	Windows & Doors					X	are multiple stops. Driver must call general aluminum every day. Must call if problem develops, & when empty. May have paperwork to
#	Georgia Pacific	Large rolls of Paper				X		be used to prevent forward movement of top row of paper. Pick-up & delivery times are critical. Excersise caution so that the edge of the paper rolls are not damaged by straps.
#	International Muffler	tail & exhaust pipes			X	X		movement may occur if pipe is not blocked or strapped. Very top heavy, careful cornering and stopping is recommended. All Appointments are
#	International Paper	Rolls of paper		X		X		heavy. The top row of paper must be secured with E lock straps to prevent forward and rearwad

Top 50 Customer Profile Van Division

# Ionics	Equipment				X	Highly Sensisitve loads. Very Expensive. Secure as shipper directs. Appointment times are critical.
# Lamson and Sessions	Plastic pipe and fittings		X			Loads are generally very stable and require minimal securement. Be sure to use E-lock to prevent rearward, forward or sideward movement of cargo.
# Mattel Toys	misc light easy	X	X			movement. Driver may be required to unload.
# Menlo Logistics	Coke Drink Prod.	X	X			
# National Standard	welding wire		X	X	X	Palletized and shrink wrapped. Very delicate load suggest cornering very carefully and avoid unneccessary quick stops
4 North American Chemical		X	X			Appointments must be made on time. Loads are top heavy
# Paper-Pack	Diapers	X	X			minimal load securement . Appointment times are critical. Driver is required to unload
# Pepsi	beverage		X	X		Avoid sudden stops. Load is highly susceptable to pilferage. Doors must be kept locked.
# Phillips Consumer Elect.	TV and VCRs				X	times. Driver should be aware of possible danger of hi-jacking or theft. Never unhook. count each stop off carefully. Make sure the count matches the bills. Sign "Customer load and Count" at shipper.
8 Phillips Petroleum	Boxes of Plastic			X		At times part of the load is double-stacked. Can very top heavy
7 Pirelli	Reels of Cable			X		~~Very Dangerous Load! Reels are usually blocked~~ by customer.Must be secured by using floor straps through large reels. Freight is very unstable other securement should be used to prevent forward movement of cargo.
3 Reynolds	Misc Alum.					Appointments must be made on time no exceptions. They ship many different commodities. Contact dispatch or Training for proper load securement. Be aware of just in time Freight.
1 Rheem	Air Conditioners	X	X			~~resecure after each drop/trailer should be locked~~ and sealed at all times/ these loads fall over very easily.
# Rockbestos	Reels of Cable		X	X	X	Secure to prevent forward and rearward movement. Block extensively. If double stacked load can be top heavy. Secure the front reel very well
9 Rubbermaid	Misc in boxes	X	X			Misc. size boxes drivers must help unload

Top 50 Customer Profile Van Division

# Soft-Play	Playground equip.				losses if we are late. Many loads go to Mcdonalds restaurants and corporate management is often on
# Southwest Chemical	Plastic Pellets			X	Secure to prevent forward and rearward movement. Loads are palletized and often double stacked.
2 Toyota	Parts	X	X		Leave two load locks at shipper. When Arriving at consignee be sure to get the load loacks that are inside the trailer or on the dock. Must be on time!
# Tyler Refrigeration	Industrial refrigerators and cases				high winds should be suggested. Securement should be discussed with the shipper vefore leaving facility. Loads are ver delicate. Be careful!
5 Unarco	Shopping carts	X	X	X	Driver may have to assist unloading. ***Note: inbound freight to this customer is coilded steel
# UOP	cargo often double stacked	X	X		Often double stacked,
# Vendo	Vending Machines				Very expensive and delicate. Secure as shipper directs. Load must not tip inside trailer. Very light high wind conditions should be avoided. Keep doors sealed and locked.
# Walmart	misc			X	Commodities very. All loads highly sensitive to theft. Trailer must be sealed and locked at all times. Never unhook loaded trailer. Secure as needed
# Ward Manufacturing	Cast iron pipe fittings	X	X		the trailer blocking should be nailed to the floor to prevent pallets form sliding in any direction. Loading time is critical
# West Point Stevens	~~Bedding,~~ Sheets mis.textile products	X	X		~~Minimum securement requirements. Loads are~~ highly susceptable to theft. Drivers must keep doors licked and sealed at all times. Driver may need to assist in unloading.
6 Zapata	Bottle Caps	X	X		very, clean. Appointment times must be kept. No
# Zebco	Fishing Equip				~~Very expensive load. Trailer must be locked and~~ sealed at all times. If driver is required to count the load watch carefully especially when making a drop. Minimal load securement.

No matter what anyone tells you, load securement in van trailers is just as important as load securement techniques on flatbed trailers. Unless you are a *perfect* driver who will never has to hit his brakes hard to avoid a 4-wheeler, never will enter a curve or a turn too fast, are extremely smooth on accelerating and braking, and who will never have to adjust suddenly to a traffic situation, you need to make absolutely sure that your cargo is not going to shift before you leave the shipper.

What tools do you have to secure your loads? The basic issue of equipment for the Van Division is:

- **4 load locks**
- **8 E-Channel Straps**
- **8 Straps with hooks on one end (Ratchet Straps)**
- **8 Ratchet Devices**

Different types of loads have different requirements. However, all load securements have certain points in common.

We call these points in common the 7 4 3 Rule

7 ***Considerations*** **we should look at before we secure the load.**

4 **Basic** ***securement techniques*** **that we will use on all cargo**

3 ***Measurements*** **that tell us whether we did a good job of securing the load.**

The 7:

The first 4 points of the seven considerations are simple. What are we trying to prevent? The movement of the cargo. The cargo movement we are trying to prevent:

- **Up and down**
- **side to side**
- **back and forth**
- **or a toppling effect**

We have to prioritize and limit these types of movement. Which of the four ways is your cargo most likely to move?

7 points to look at before you secure the load

Points 1- 4: prioritize and limit the 4 types of movement

The fifth point is basic. Start from the bottom and work up. This means DUNNAGE! The blocking and bracing with wood that supports and structures the cargo. If we do a good job with the dunnage we have half the battle already won. Then our load securement simply becomes a matter of holding the product down into the cradle created by the dunnage.

7 points to look at before you secure the load

Point 5: Start at the bottom and work up!
Dunnage: Wood used to block and brace cargo.

The sixth point is simple. Protect the Product. Padding! Sometimes we have to protect the product from our securement devices and sometimes we have to protect our securement devices from the sharp edge of the cargo.

7 points to look at before you secure the load

Point 6: Protect the Product! Use padding, corner boards, dunnage to keep the cargo and the straps from damage.

And finally the seventh point, Dress out the trailer. Lay out all the equipment and the tools you are going to need *where you are going to need it* before you jump into securing the load. This will save you time and frustration.

7 points to look at before you secure the load

Point 7: Dress out the trailer! Lay out your equipment and tools where you are going to use them.

4 Basic Securement Techniques

- Direct Pull
- Counter Balancing
- Bellywrapping
- Cross Strapping

Many of our cargo claims stem from two types of driving accidents, in one of these the first sentence of the accident report reads: *I had to hit my brakes hard.* In these cases the cargo invariably shifts forward (guess where you sit). In the other, the driver usually enters a maneuver *too fast* and is caused by the inertia of the cargo (the vehicle turns, the cargo tends to continue in a straight line).

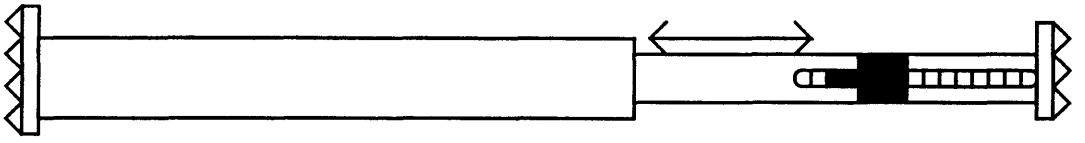
Let's look at the type of securement devices you have:

Load Locks

***Load locks* are used for two primary purposes (though we would hate to limit your ingenuity):**

- ***blocking* and *bracing* the back of a load.**
- ***support* for cargo the has varying heights in a trailer, either directly or as part of a *false bulkhead***

They are used by extending a sliding arm across from one side wall of the trailer to the other. The device is held in place by the tension of it's "push" against the walls, *it is wedged in place.*

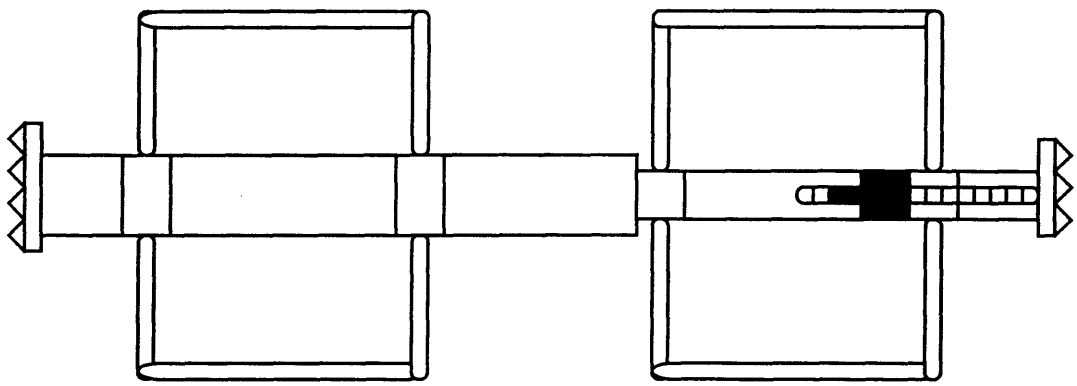


A Butterfly Load Lock is the same structure with additional "wings" to help hold cargo in place. It's called a butterfly because of the wings. They can be used for top and bottom of a load or just on the top half of the load in conjunction with dunnage and a straight load lock on the bottom half.

Whenever you go to put a Butterfly load lock up in the top half of a load, always first put up a straight load lock. This will allow you to:

- **rest the butterfly load lock on top of the straight one while you secure it.**
- **get a greater extension on the butterfly load lock because you have the straight one already pushing out on the wall**

Then you can take the straight one down and use it below.

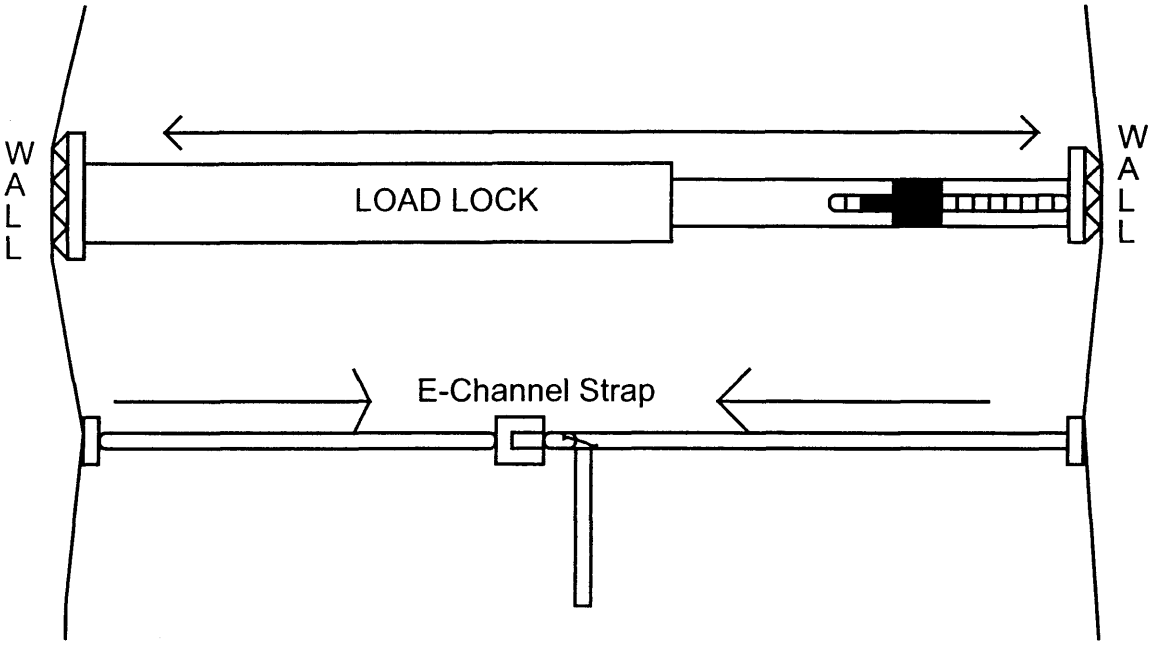


Using load locks:

When a load lock is pushed out against the two side walls, there is a lot of pressure on the locking arm. When you hit the release button for that locking arm, the handle snaps back with a lot of force. *Keep the locking mechanism to your right so that you don't have to reach over the locking handle when it snaps back.* This will keep you from breaking fingers.

***Use bungees as extra hands when you are putting up load locks*, so they don't drop on one end or the other. Putting the two hooks of a bungee in the E-Channel Tracks that line the wall of Van trailers forms a loop in the bungee that you can rest one (or both) end(s) of the load lock in. This will allow you to concentrate on locking it down instead of holding it up.**

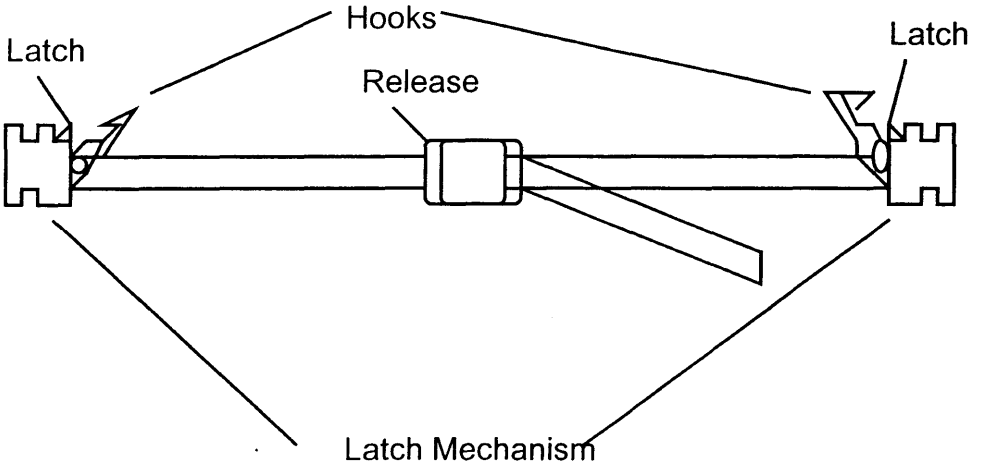
Everywhere you put up a load lock put an E channel strap up just slightly below it. **With the walls constantly flexing as you run down the road, a load lock can slip down bit by bit. By putting in an E-Channel strap slightly below it, you are pulling the walls in as the load lock is pushing the walls out. This creates a "V" , a tighter area that the load lock funnels down into. The figure below shows an exaggerated view of this:**



E-Channel Straps

E-Channel straps can be used for a wide variety of purposes, from holding cargo to the walls of the trailer (their original purpose) to use with load locks to belly wrapping separate pieces into one unit. E-Channel straps snap into slots in tracks in the walls of the trailers. The points of the E-Channel strap you want to be aware of are:

- **the latch mechanism**
- **the release**
- **the hooks**



The Latch mechanism needs to be inspected for free movement of the latch. **The sides of the mechanism can be squeezed in over time, this narrows the space that the latch moves in so that the latch can't go all the way back. When inserting the latch mechanism into the slots of the E-Channel pull the latch back. The top of the latch slips into the slot first, then the bottom. The latch should always be to the top of the slot. If you turn it upside down, the pull of the strap when tightened can unlatch the mechanism and pop it out of the wall. Always tug on the strap to make sure the latch mechanism is firmly secured before fully tightening the strap.**

The strap release **operates basically like a seatbelt. To release the strap so that it slides through the release mechanism push the release in. The strap will slide freely to tighten or loosen. Frayed or cut straps will bind up in the release mechanism. After tightening the strap, keep the tension on the strap and tie a half-hitch in the loose end of the strap to keep it from sliding through the release mechanism and loosening.**

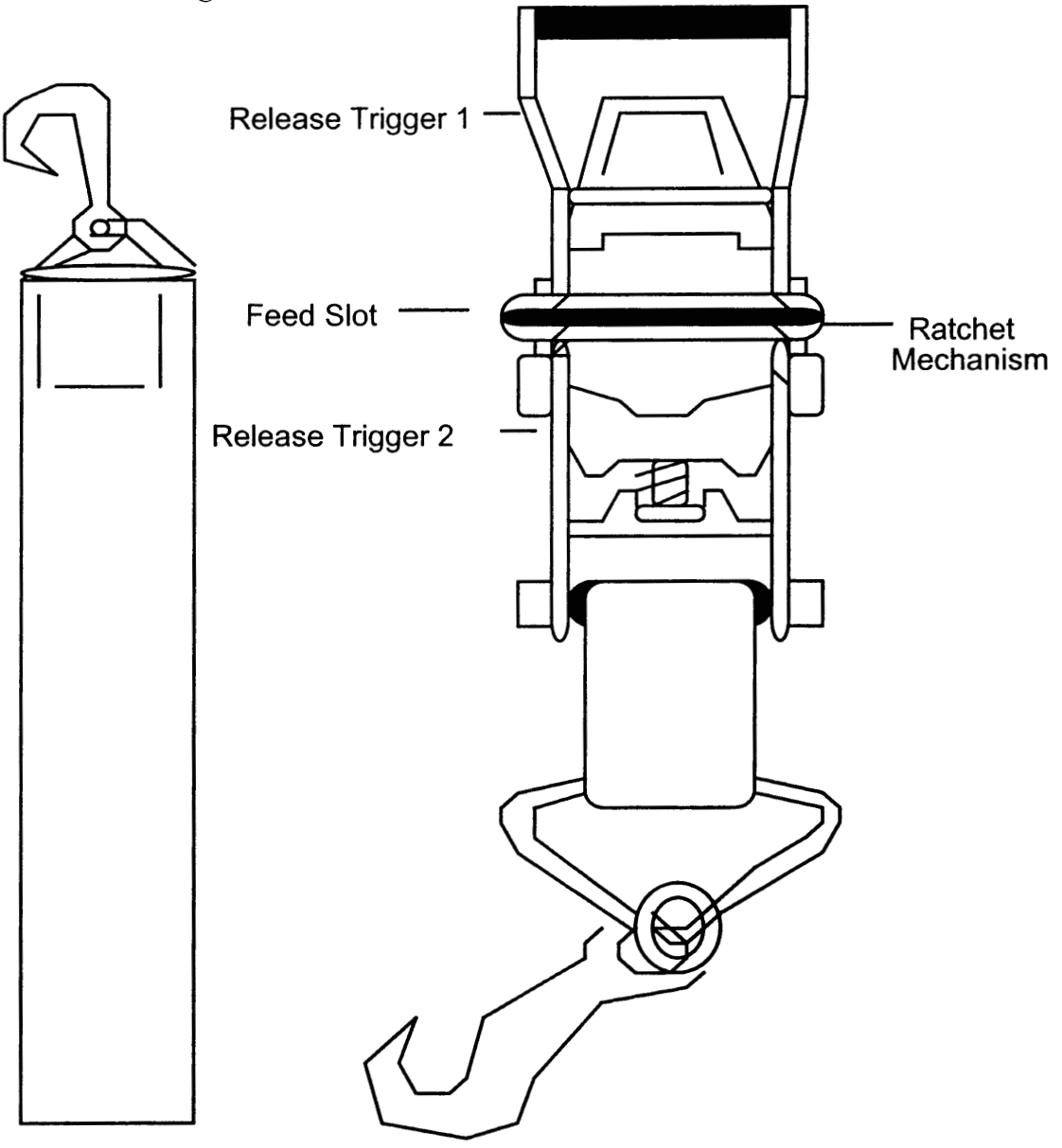
In addition to the latch mechanism, the straps have hooks on either end that add another dimension or use. The strap hooks have a hole in the center of them so that the two ends can be hooked back to themselves. This allows you to circle canisters, or to take separate pieces and combine them into one unit of cargo.

Ratchet Straps

Ratchet straps are the most secure device in your equipment arsenal. **When storing your Ratchet Straps always roll them with the hook to the outside. This way you can hold on to the hook and with a flick of the wrist unroll the strap. It also keeps the hook from flying around and damaging cargo or hitting people. The hooks on the end of the strap hook into either chains that are recessed into the floor or recessed, flip up "D" rings on the newer trailers. These chains or "D" rings are spaced evenly down both sides of the trailer about every four feet. The older styled chains that are set into the floor have been a problem. When lifted up to secure to a**

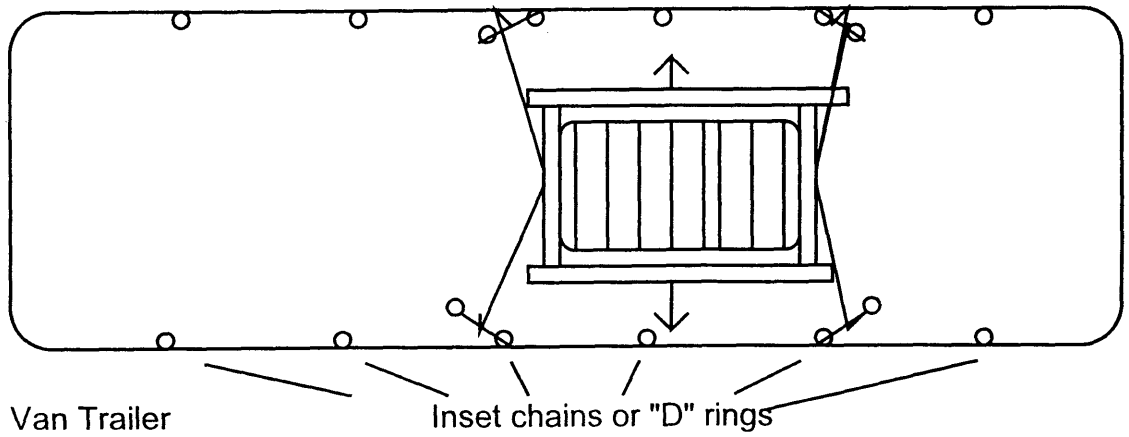
hook it leaves a hole that is open to the bottom of the trailer. Whenever using these make sure you have some rags to stuff into the opening to keep water from spraying up into the cargo hold.

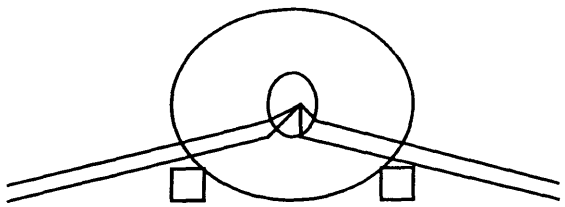
The tightening mechanism is a simple ratchet device that works by feeding the strap through a slot, pulling the strap tight, and then pumping the ratchet mechanism which rolls the strap creating tension. There are two release triggers on the ratchet mechanism that allows you to break this tension and allows the rolling slot to spin freely. The strap then can be pulled out of the slot. Different drivers have different styles with these ratchet straps. Some drivers will unroll the strap completely to feed the strap through the slot. Others to save time and effort in completely unrolling and re-rolling the strap, some drivers will double up the strap to feed it through the slot.



Counter Balancing

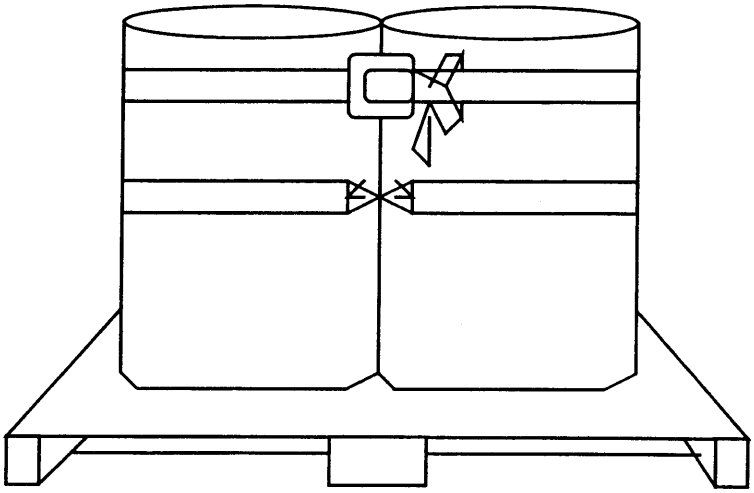
Ratchet straps can be used for counterbalancing. Counter Balancing is when you use two straps to pull in opposite directions to hold a piece of cargo in place. An ideal example of counter balancing a piece of cargo is the use of Ratchet Straps with a coil.





Belly wrapping

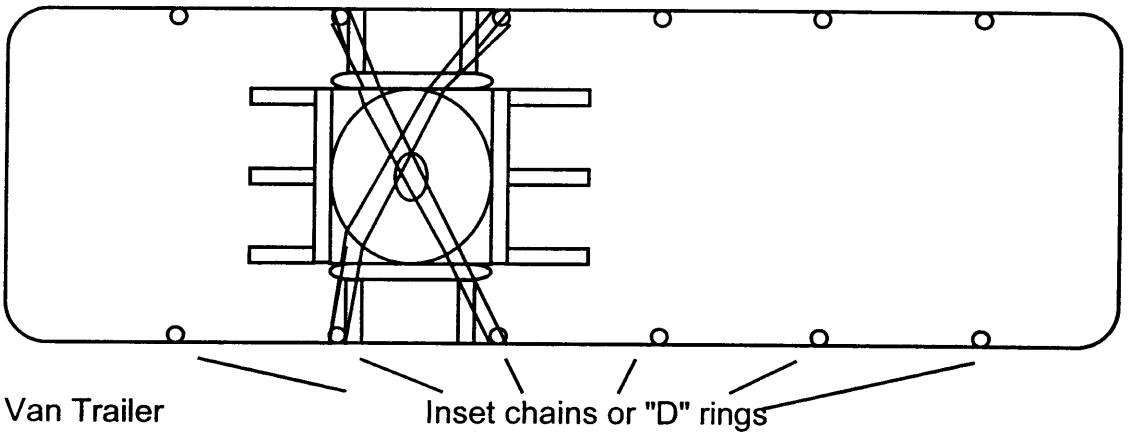
Belly wrapping is the term used to define the use of E-Channel straps to secure two or more pieces together to create one cargo unit for securement with additional securement devices.



When using E-Channel straps in this manner make sure the hooks on the straps face outward to keep the hooks from digging into the cargo.

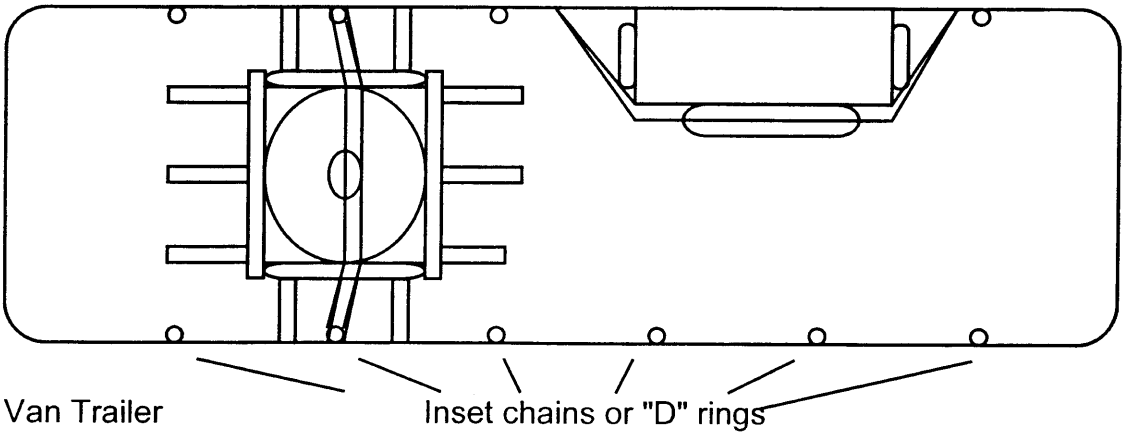
Cross Strapping

Cross Strapping is the technique of crossing two securement devices (i.e.: Ratchet straps or E-Channel straps) to prevent or limit cargo movement.



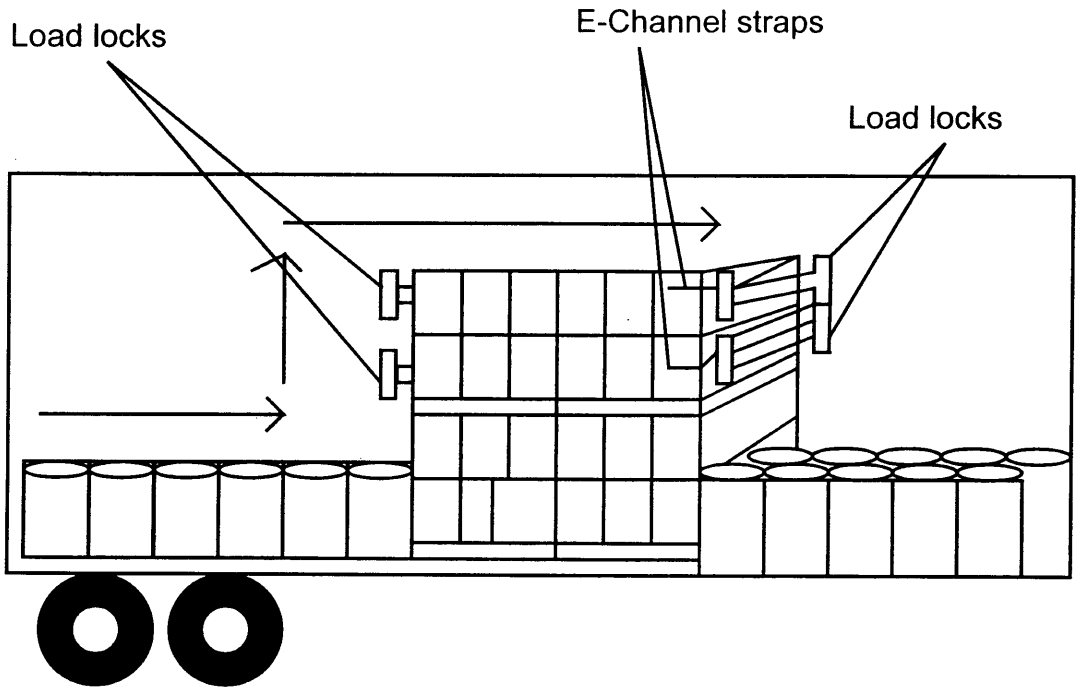
Direct Pull

Direct Pull is defined as the use of a securement strap to limit cargo movement in a specific direction (i.e.: against a wall, down to the floor).



Bracing/Blocking

Bracing/Blocking are the terms used to describe the use of securement devices or dunnage to limit cargo movement or support cargo, such as in securing a false bulkhead to limit the movement of varying layered cargo.

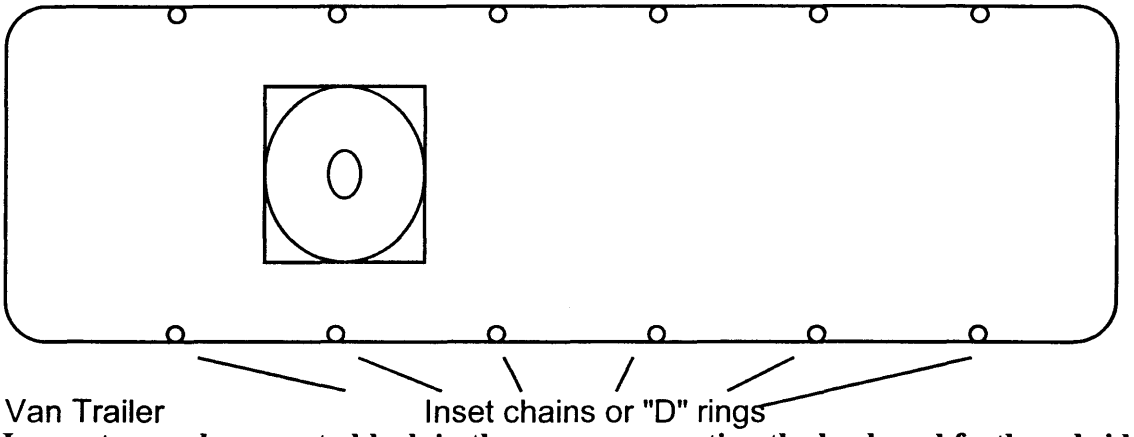


!!! Alert !!!

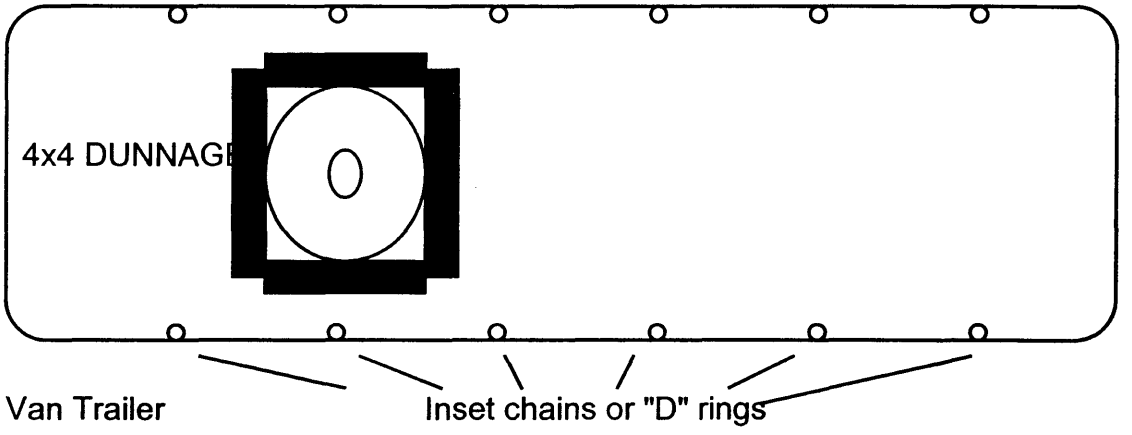
Using Dunnage COILS

Using dunnage for blocking and bracing is an art form in itself. It becomes extremely important with such loads as coils. The diagrams on the following pages will show you how to build up the dunnage so that it works with your securement devices.

Step 1 in dunnage use:

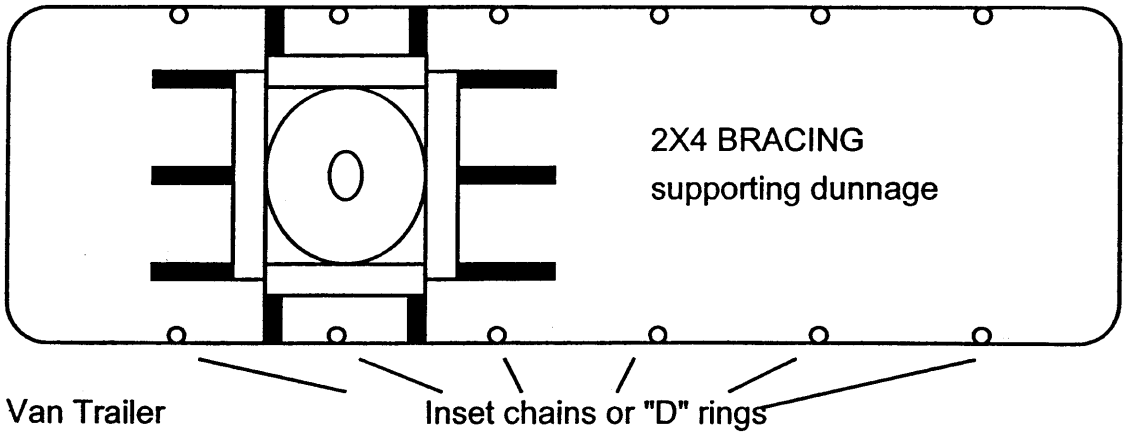


Lay out your dunnage to block in the cargo, preventing the back and forth and side to side movement of the base.



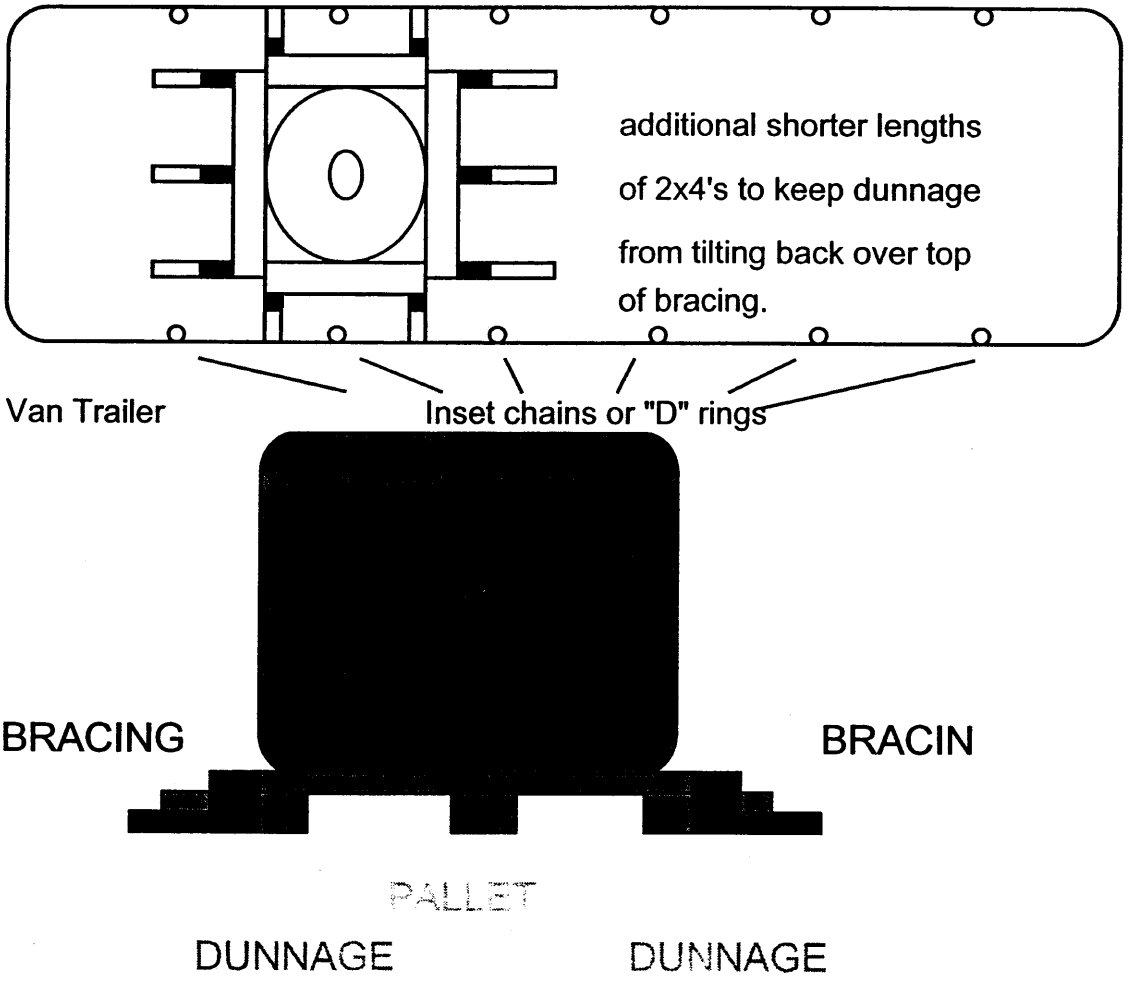
Step 2 in dunnage use:

Brace the dunnage on the floor with 2x4's butted up against the original 4x4's. Make sure you nail these securely into the floor.

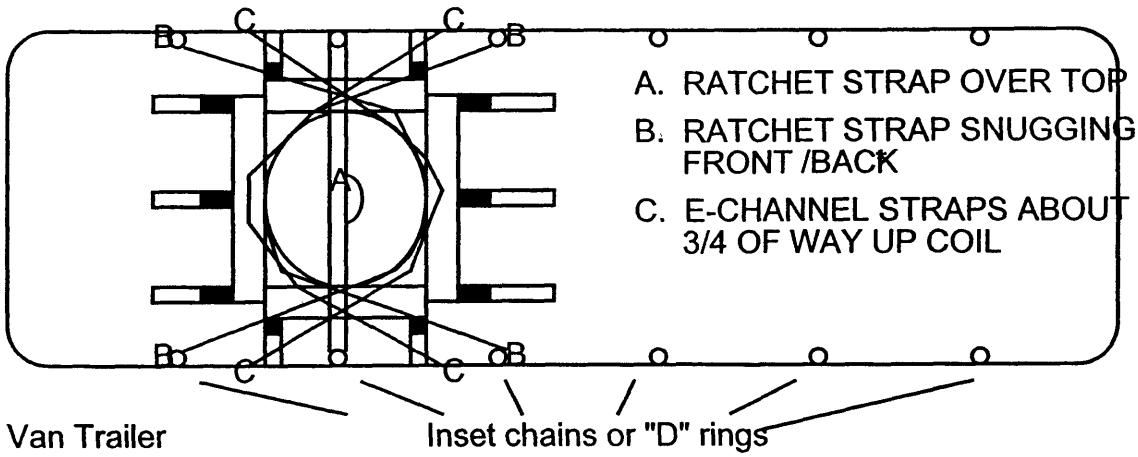


Step 3 in using dunnage:

Add shorter lengths of 2x4s up against the 4x4 dunnage on top of the 2x4 bracing and nail in place. You will end up with a staircase support to your dunnage.

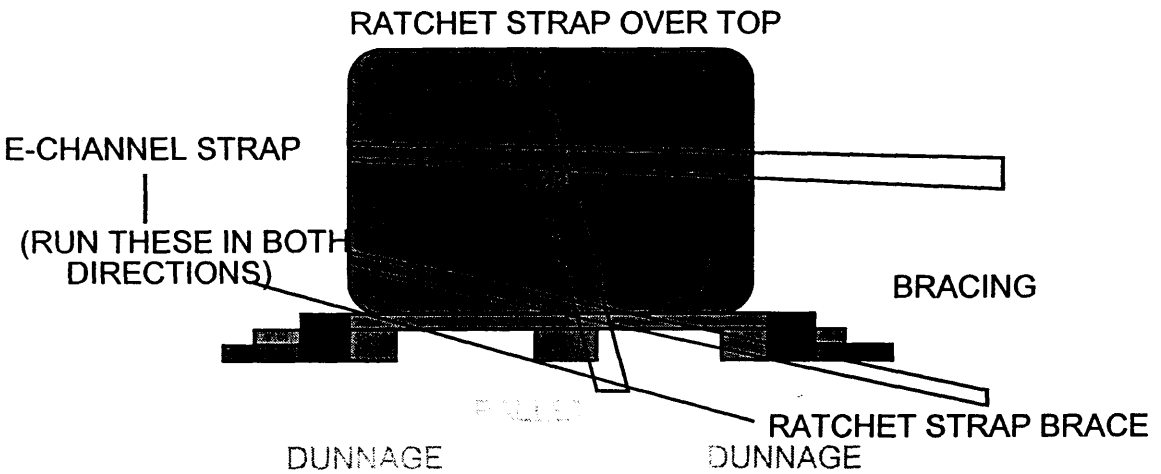


Now that you have blocked and braced the bottom of the cargo, now you are ready to add your securement devices.



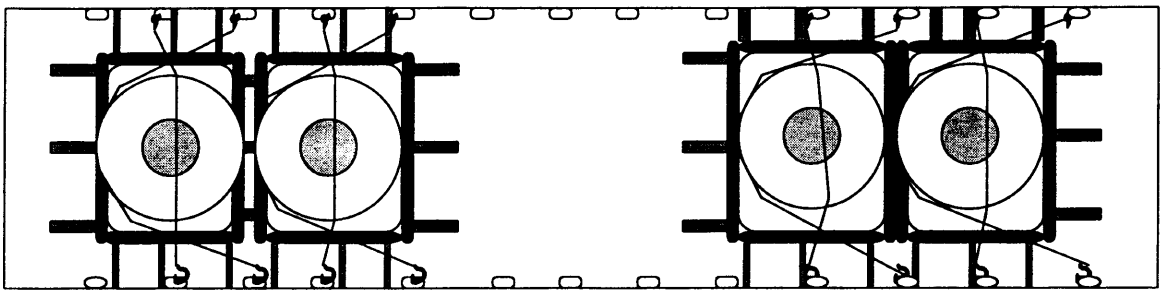
The diagram shows the bracing E-Channel strap and bracing Ratchet strap in one direction. Remember to add the same straps to brace in the back.

SIDE VIEW WITH STRAPS IN ONE DIRECTION.



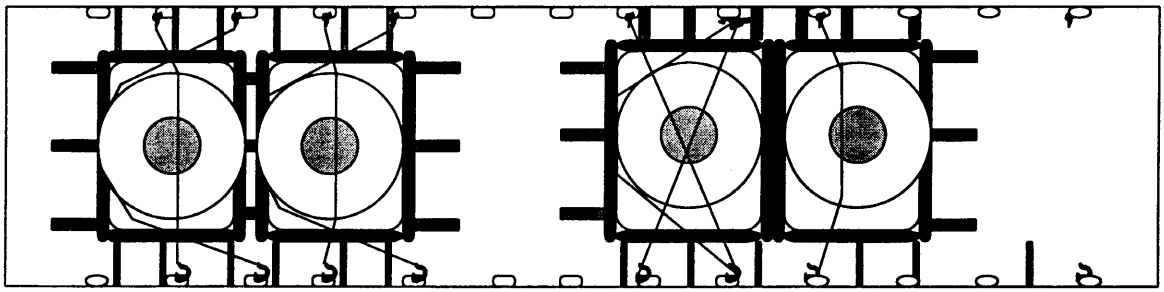
REMEMBER TO ADD YOUR BRACING STRAPS ON THE OTHER END ALSO.

The same idea will be used with a series of coils, bracing in the front coil and the rear coil. However, you will be limited by the amount of equipment you have. You have to prioritize where you use your equipment to prevent the greatest danger of movement. In many cases, especially coils, the most dangerous movement is to the front of the vehicle where you are sitting. This is most often caused by having to hit the brakes hard in reaction to sudden traffic changes. Below is an example of how to get the best utilization out of your Ratchet straps for a coil load. Remember that you are only issued 8 Ratchet straps.

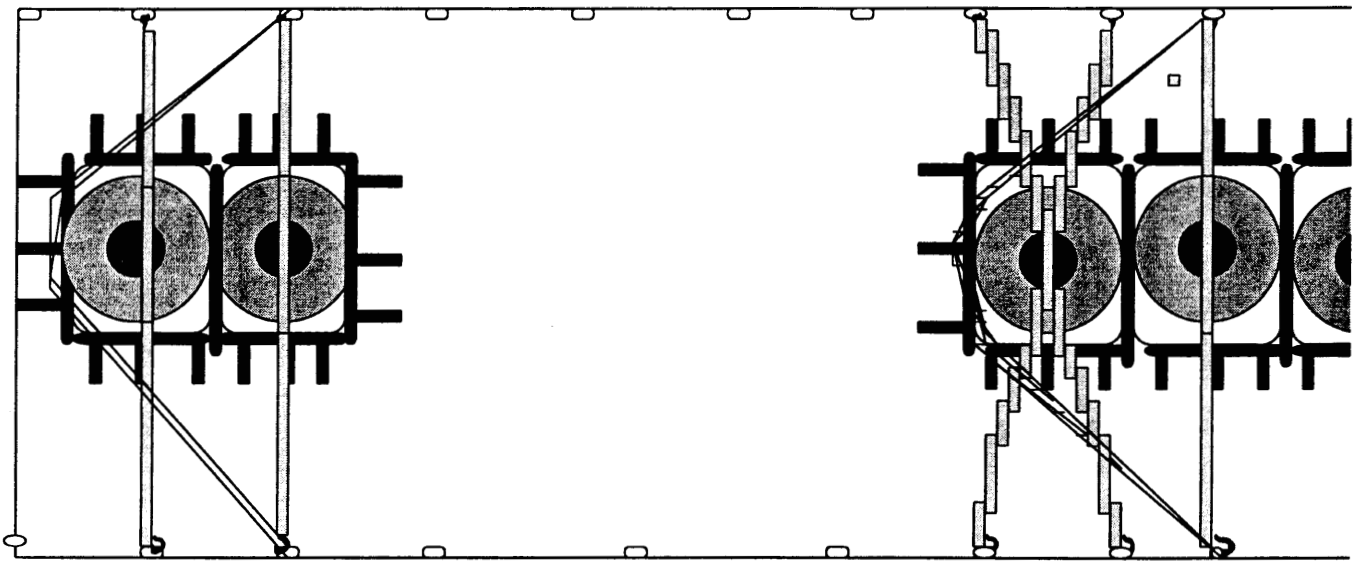


You will note that the dunnage is in place to block and brace the cargo, creating a cradle that the cargo sits within. A Ratchet strap over the top holds the cargo down into that cradle. An additional Ratchet strap is used in a "V" around the bottom of the coil to reinforce or prevent the forward surge of the cargo if we have to hit our brakes hard. We end up using two Ratchet straps per coil, for a total of 8 straps. If available we can use our E-Channel straps and/or load locks to limit backward motion or to additionally limit the forward surge.

We can't always guarantee that the cargo is going to be placed perfectly centered between the D-rings when that happens you do have alternatives. You can "X" your ratchet straps over the top of a coil. Look at coil number 3.



The front coil of the second grouping is the more important in terms of preventing forward movement. Again we can use our E-Channel straps and Load Locks to limit backward motion of the cargo or to additionally limit the forward motion.



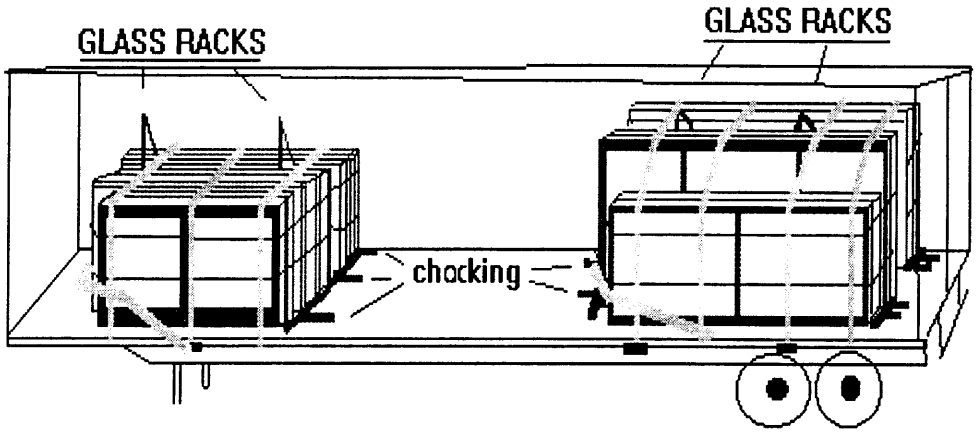
!!! Alert !!!

GLASS LOADS

Glass cargo is another critical load. Once again it is important to make sure your dunnage is nailed in well and that you prevent the potential forward movement of the cargo.

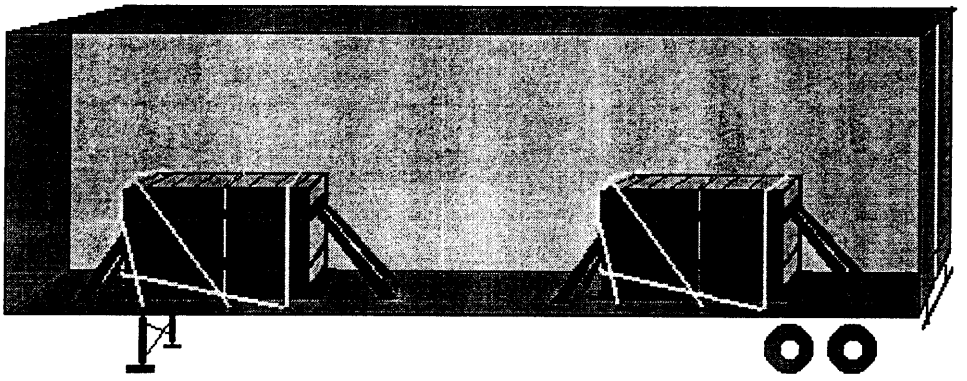
While the customer may do the majority of laying out and nailing in the dunnage, make sure that you check it all. Even properly secured dunnage will not prevent cargo from moving if you hit the brakes hard. You must use your straps to prevent the INITIAL movement of the cargo, thereby preventing the forward movement of the load.

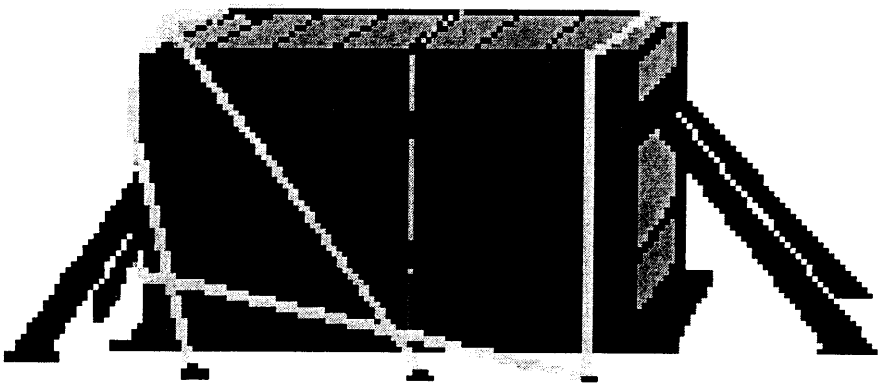
GLASS CRATED AND BANDED TOGETHER IN GLASS RACKS.
RACKS ARE USUALLY METAL AND NEED TO BE PADDED
WELL TO KEEP FROM RIPPING TARPS.
TIEDOWN: STRAPS OVER THE ENDS OF THE WOODEN
CRATES PULLING STRAIGHT DOWN TO THE TRAILER.
ALTERNATE WINCHES PULLING LOAD TO THE CENTER.

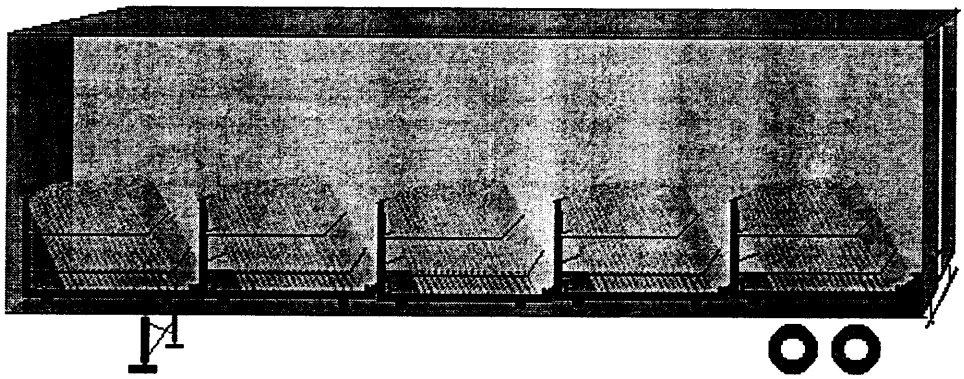


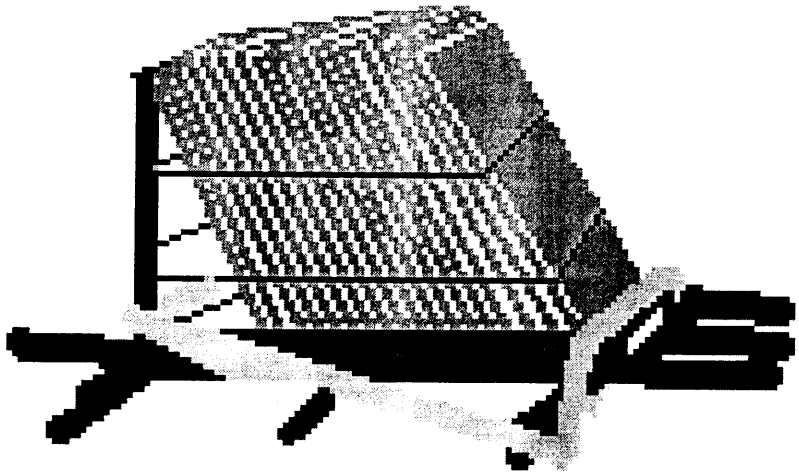
Run ratchet straps around the front down low to prevent the forward movement.
Make sure that you block and brace on all four sides.

Glass Load Sample 2



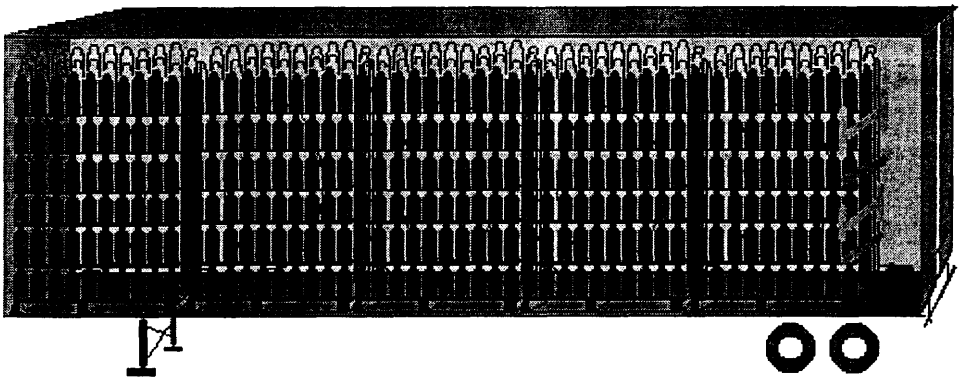




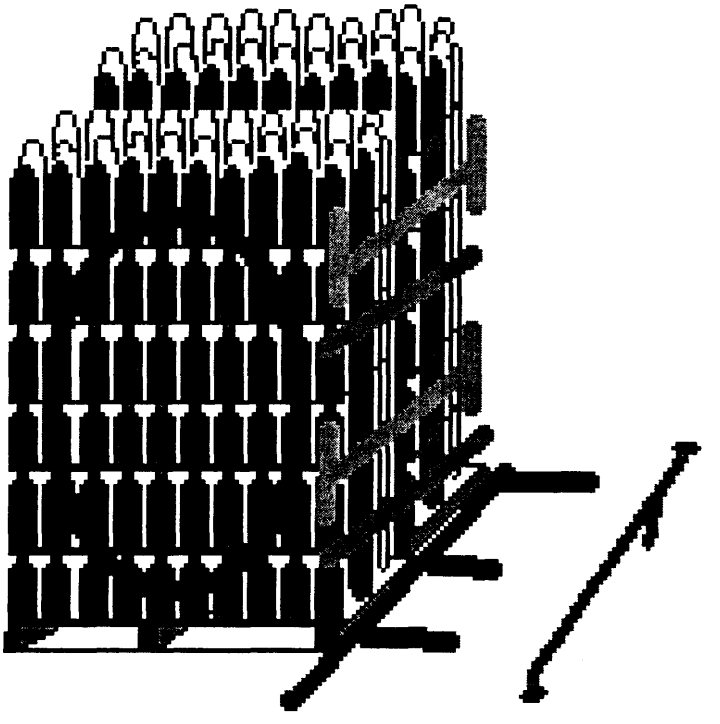


On this type of glass load the glass is banded to an L-Frame. Block and brace the frame. Use ratchet straps to prevent the forward movement and to keep the back end down into the cradle created by the blocking and bracing

Note: in this diagram the circles on the side denote air bag space fillers that keep the cargo from shifting. Use load locks and E-Channel straps at the end to keep cargo



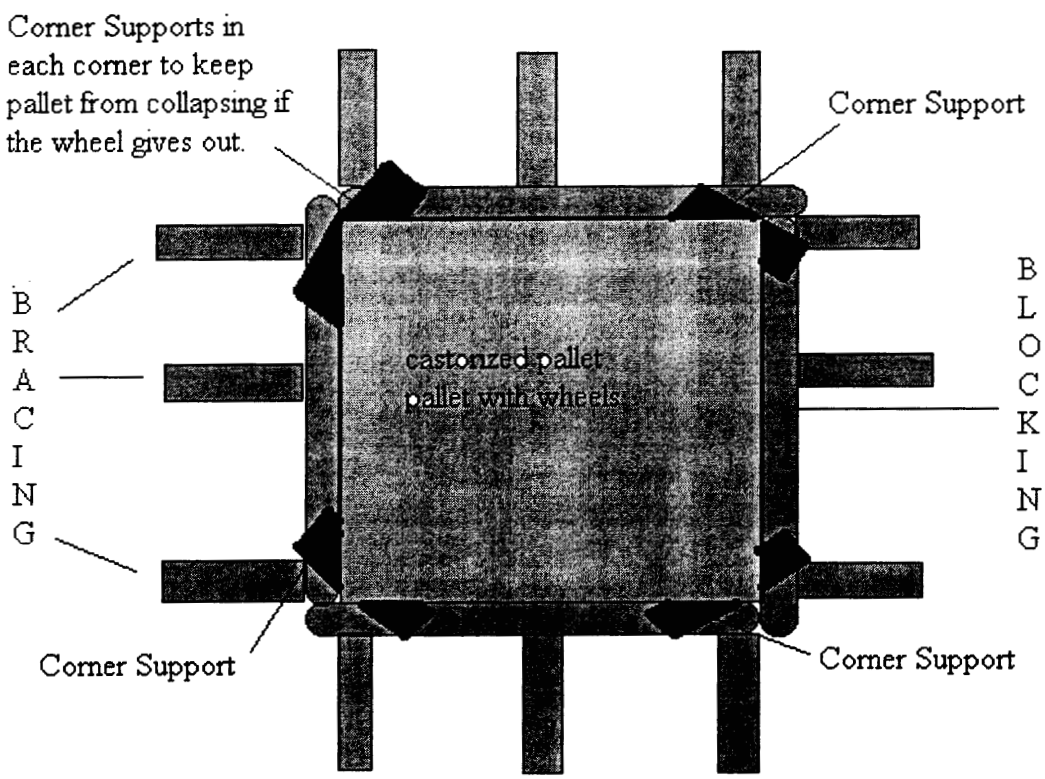
from spilling. Note the dunnage at the bottom rear.



!!! Alert !!!

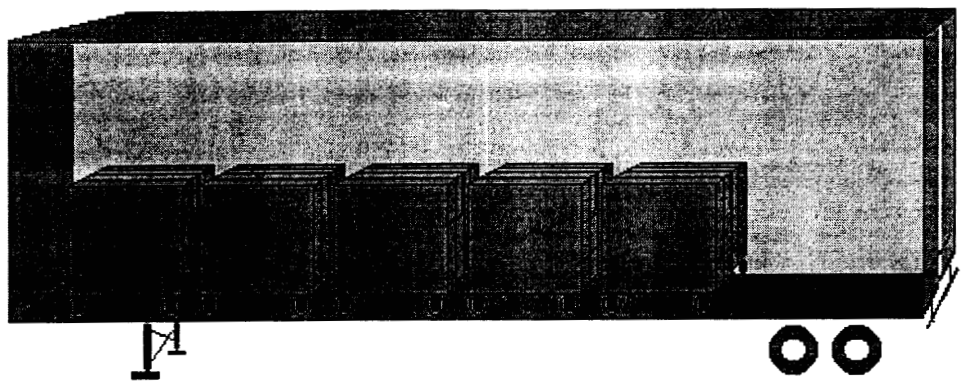
CASTORIZED (WHEEELED) LOADS

On any wheeled load (ie: castorized pallets, machinery on wheels, etc) make sure the wheels are in the locked position to help prevent the individual pieces from rolling around in the trailer. Lay out your dunnage in the standard 4 sided E configuration as noted in the section on coils. But in addition to this add a diagonal piece in each corner to build the dunnage up (see the following diagram). This way if a castor collapses the pallet will fall onto the dunnage instead of all the way to the trailer deck. A forklift will still be able to get under it and the cargo will not slide off the pallet.

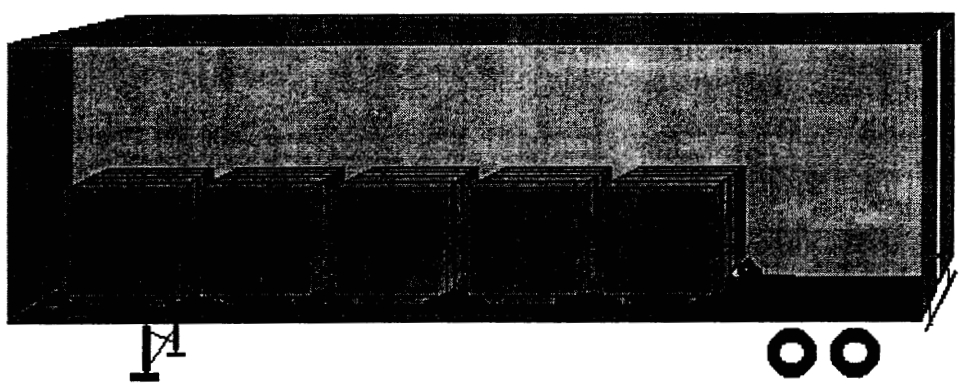


Your securement then holds the cargo down into the cradle created by the dunnage (blocking and bracing).

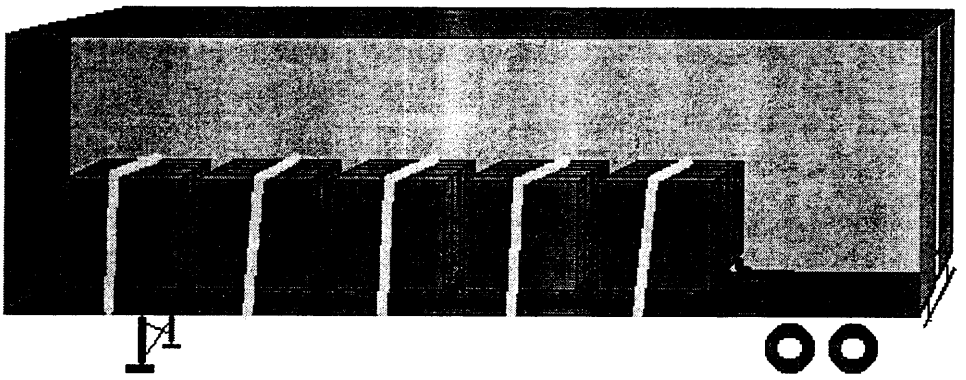
In addition to blocking and bracing the wheels of this type of load, you may have other considerations such as drawers or appliance doors to contend with. Shrink wrap, packing tape, turning the drawers to the bulkhead all may be alternatives that you need to look at. Take a look at the next example where we are hauling wheeled filing cabinets. In addition to the blocking, bracing, and securement straps, you can see that the drawers of the cabinets can still open especially if we are backing up and stop abruptly. How are you going to prevent this from happening?



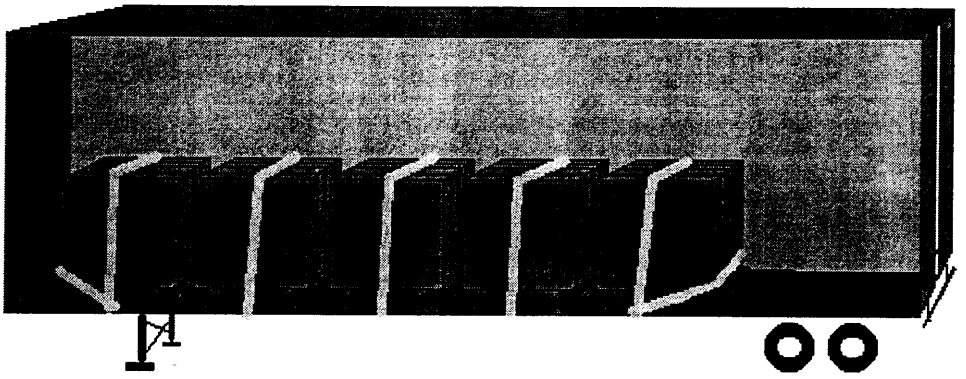
Start with your dunnage blocking and bracing each row as they are loaded if the individual cabinets cannot be shoved up against one another. Remember to build up the corners to keep the cargo braced if a wheel collaspes.



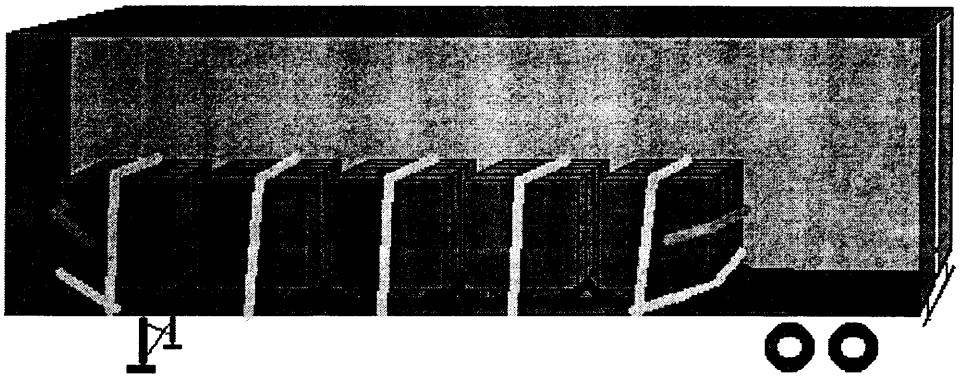
Run a Ratchet strap over the top of each row. If there are more rows than you have straps, then cross strap over the top to hold the cargo down into the cradle of your dunnage. See next page.



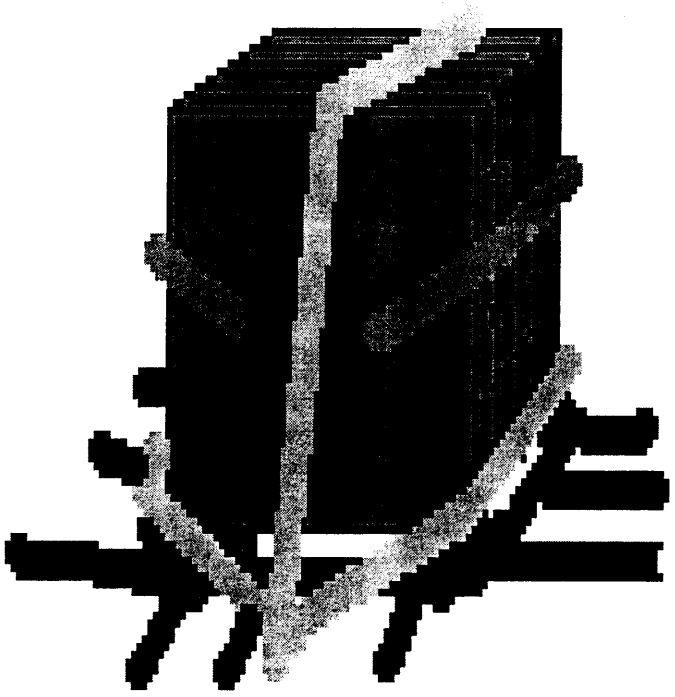
Add a ratchet strap down low around the front of the cargo to prevent the forward motion. If you have enough equipment add a ratchet strap down low around the back of the cargo to prevent the rearward movement.



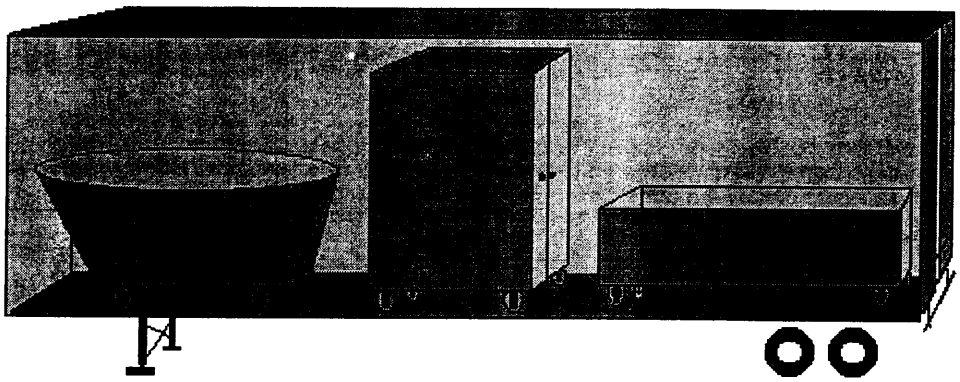
Add your E-Channel straps up higher to provide additional securement.



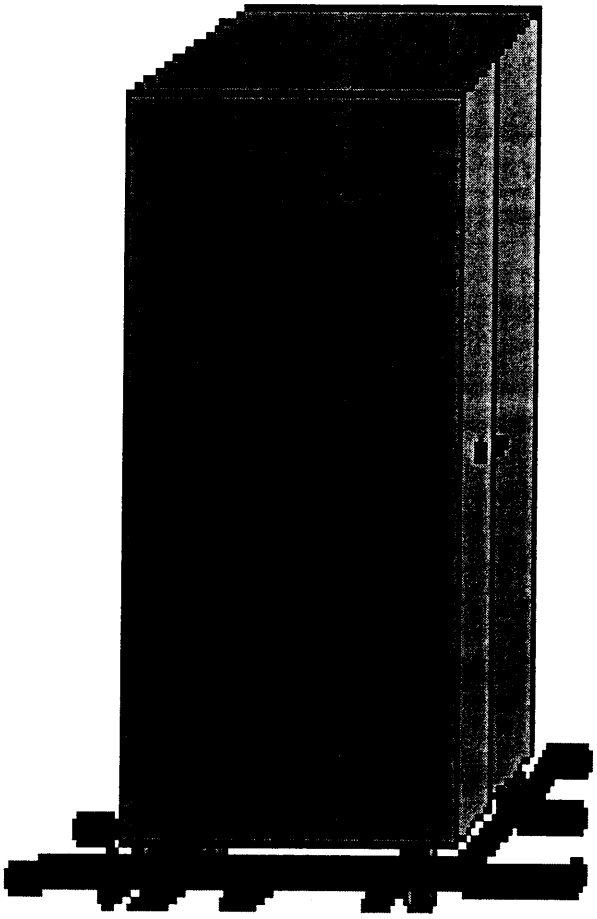
Look at the single piece down below. *Remember we would have had to secure the drawers with tape or shrink wrap or cardboard depending the amount of space between each row of cabinets.*



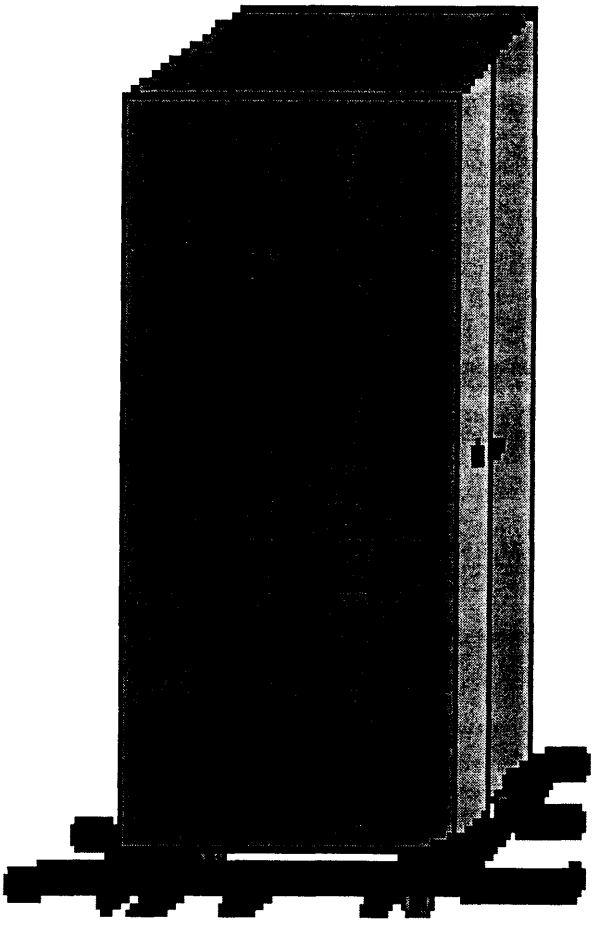
Another type of wheeled load is one where there are individual wheeled appliances. **On many of these loads the wheels can be retractable. If this is the case, then make sure the wheels are in the locked position. This will give you a much more solid, stable base to work with.**



Lay out and secure your dunnage as we did for the cabinets.



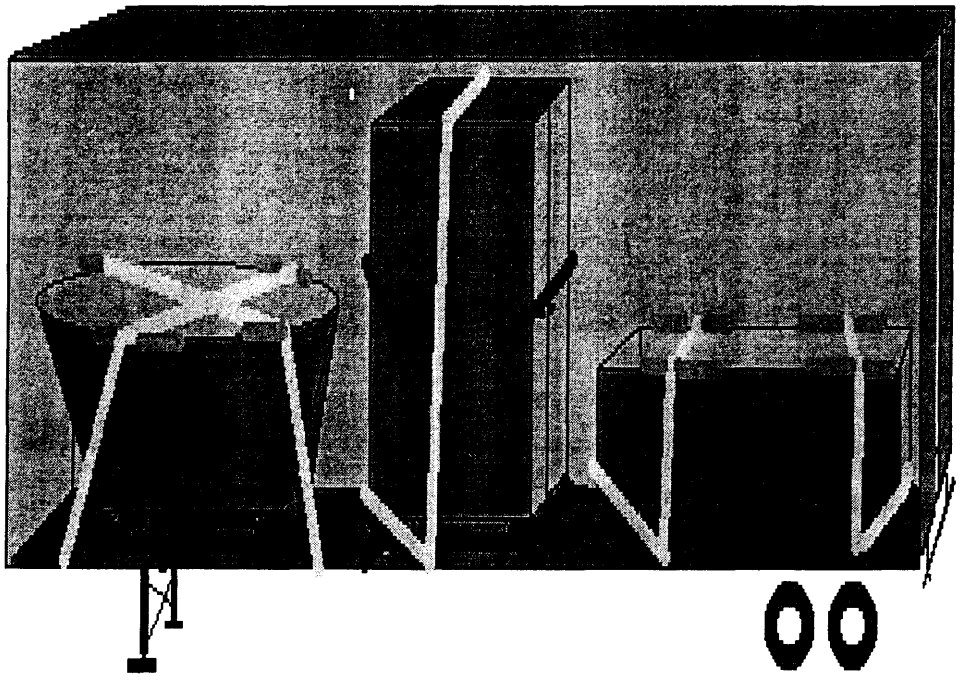
Build up the dunnage on the corners in case a wheel collaspes.



Remember to secure any doors or drawers with tape, plastic wrap, etc.

Depending on the shipper, these appliances may be loaded in several different ways: the most common are against the walls (and therefore may be secured with E-Channel straps), or the standard load from front to back.

Lay out the dunnage, and block the corners. If you do a good job with the dunnage then all your secure has to do is hold the product down into the cradle you created with the dunnage and prevent any forward movement. Watch out for sharp edges and/or materials that will need padding.



!!! Alert !!!

SHORTAGES COST YOU MONEY

Quite unintentionally a driver will be short on the count of cargo for a load. While it is unintentional it is very costly and is unacceptable. There are several steps the driver can take to avoid this problem.

1. The driver must verify the count and condition of every piece of freight that goes on an Arrow trailer at the loading point.

2. Compare the SHIPPER'S BILL OF LADING with your piece count. Often the shipper's bill will number each item whereas your Arrow Bill of Lading will use the highest common denominator. (IE: You may count 18 pallets of boxes on your trailer. The Shipper's paperwork may record 1800 boxes. Can you verify the count of boxes on the shipper's paperwork? No!!!!)

3. **In every case where you, the driver, cannot verify the count and condition of the pieces going on the trailer or where the piece count is different on the paperwork, YOU MUST WRITE: SHIPPER'S LOAD AND COUNT on the paperwork and have the shipper sign this notation. If the shipper refuses to sign this statement, call your Fleet Supervisor. NOT DOING THIS LEAVES YOU AND ARROW OPEN TO AN OS AND D CLAIM (OVERAGE, SHORTAGE, AND DAMAGE).**

4. On sealed loads where you cannot verify the piece count you must write: **SHIPPER'S LOAD AND COUNT and get a signature on this notation before leaving the shipper.**

5. On sealed loads write on the Arrow Bill of Lading, "LOAD ARRIVED WITH SEAL INTACT". Have the consignee initial this notation when he/she signs for the delivery. Do this at any additional drops.

6. On multiple drop loads separate the different deliveries by cardboard, plywood, or some means of distinguishing what cargo goes to what delivery point. **REMEMBER TO RE-SEAL THE TRAILER WITH ANOTHER SEAL AND NOTE THE SEAL NUMBERS ON THE**

PAPERWORK. Your lock will not suffice. Once a consignee sees a delivery without a seal, Arrow can count on getting a shortage claim. **At the first drop have the consignee initial the new seal notation on the paperwork. Continue to do so on each ensuing drop.**

FAILURE TO TAKE THE ABOVE STEPS CONSTITUTES DRIVER NEGLIGENCE.

When you receive a load assignment it should be followed up by what is called an UOE screen (sample below), follow the instructions on that screen. Those instructions may refer you to specific pages within this load securement packet. Refer to those pages each and every time.

◄►139◄ [redacted]

◄ ♦ ◄CTRL #♦ ◄ DATE TIME

◄ ♦ ◄TY♦ ◄ST♦ ◄TRAN♦ ♦

♦ ♦ ♦ ◄ LG♦ ♦ ♦ ♦ ◄ ♦ ♦

◄

SPECIAL INSTRUCTIONS

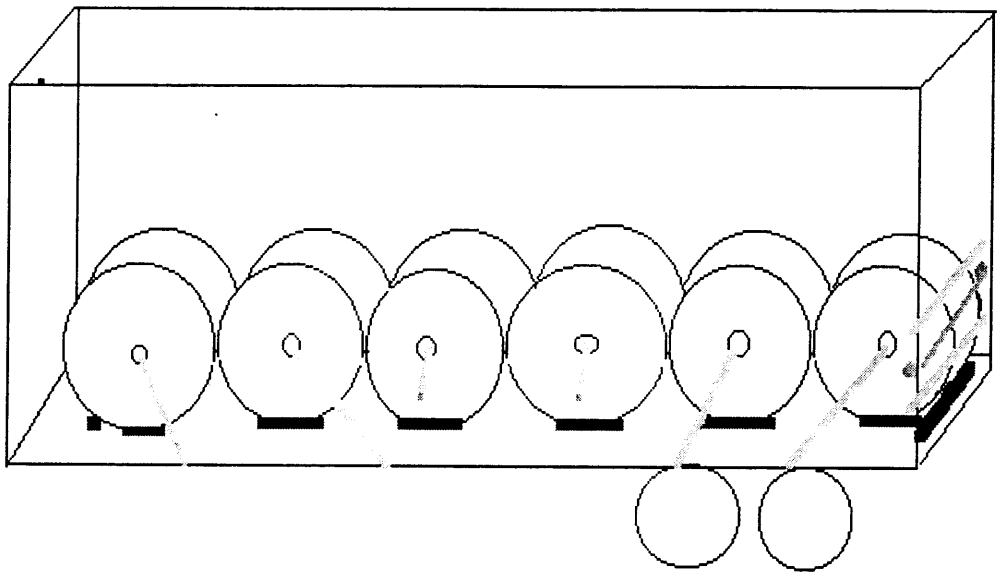
REFER TO THE LOAD SECUREMENT PACKET
PAGES ► ◄THRU ► ◄ ON THE FOLLOWING
COMMODITY TYPE MARKED WITH AN "X" &
FOLLOW ALL ADDITIONAL NSTRUCTIONS
THAT ARE MARKED WITH AN "X"

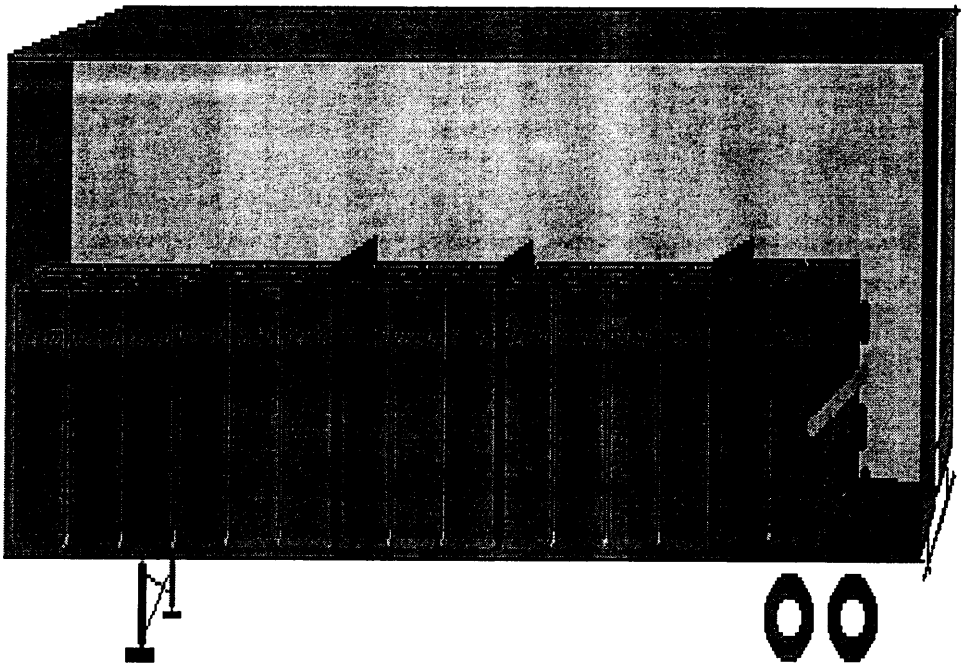
► ◄COILS ► ◄GLASS ► ◄WHEELED ► ◄PAPER OR
► ◄OTHER ► ◄.

ADDITIONAL INSTRUCTIONS

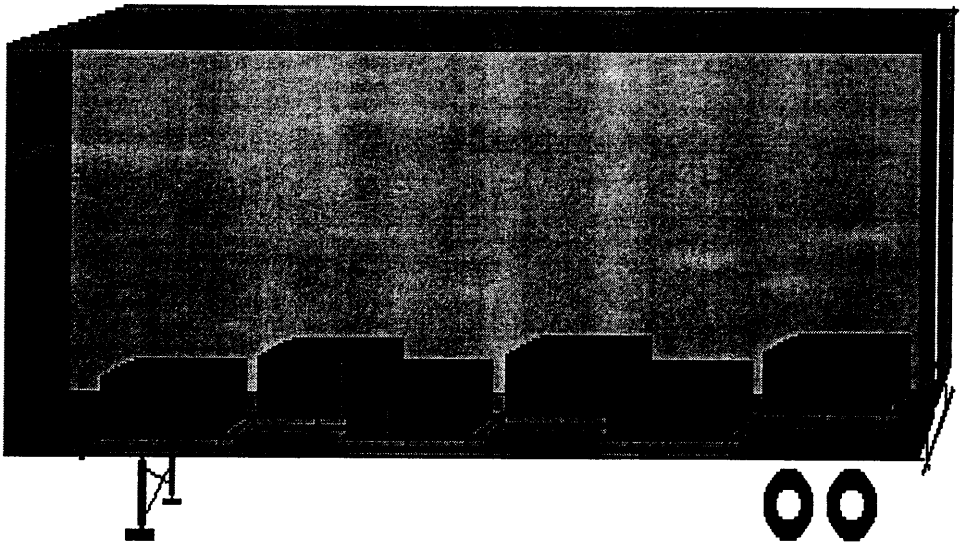
► ◄ MULTIPLE DROP LOAD, RESEAL AFTER EACH DROP.
► ◄ TRAILER MUST BE SWEPT & NAIL FREE BEFORE DROPPING.
► ◄ TRAILER MUST BE SPOTLESS, LOADING FOOD PRODUCT.
► ◄ MUST NOTE "SHIPPER LOAD & COUNT" ON ORIGINAL B/L.
► ◄ DRIVER UNLOAD/LUMPER
► ◄ MUST GET LOADED AND EMPTY WEIGHT.
► ◄ MUST CALL FLEET SUPERVISOR FOR OTHER INSTRUCTIONS.
OTHER ► ◄

Other Van Loads



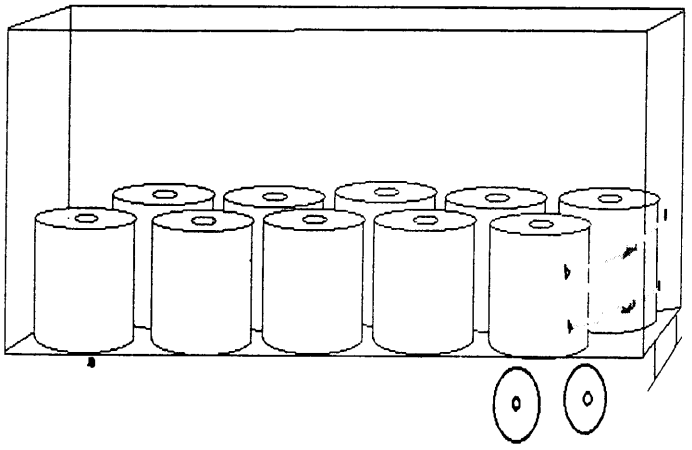


Use load locks and E-Channel straps at rear. Remember to resecure after every drop.



Strap down the skid the generator is secured to. Be careful of running straps over the unit if it has doors or frames that can be "tweaked" or warped by undue pressure.

Paper Loads



WEIGHT DISTRIBUTION/PLACEMENT

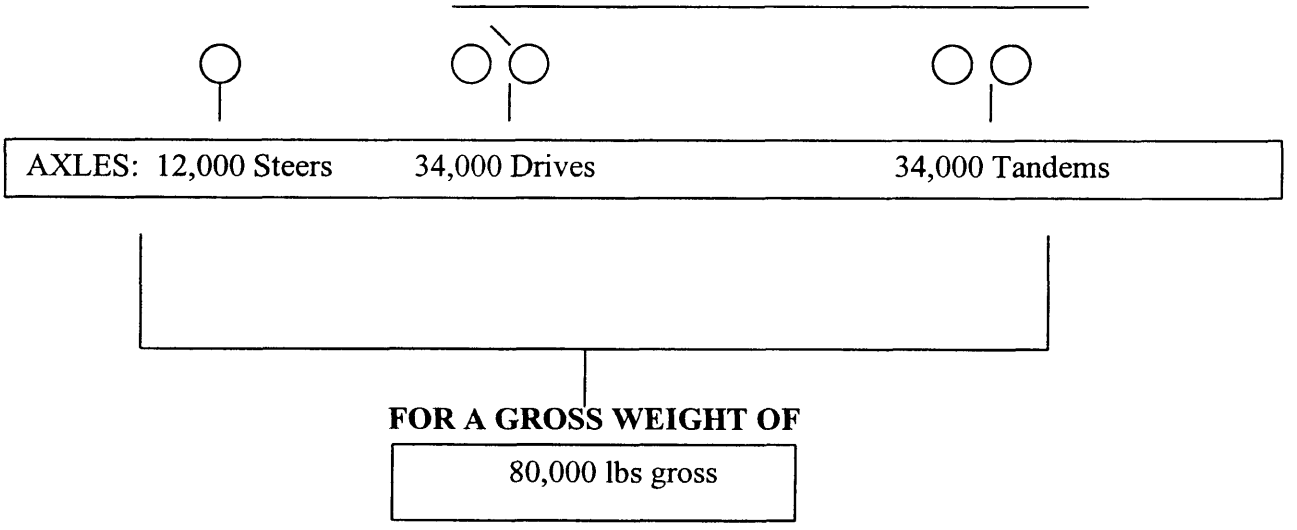
Cargo Weight Displacement

Always get a *tare weight* (empty weight) when you first get your truck. Knowing what your tractor and trailer weighs empty allows you to know how much cargo weight your vehicle can carry.

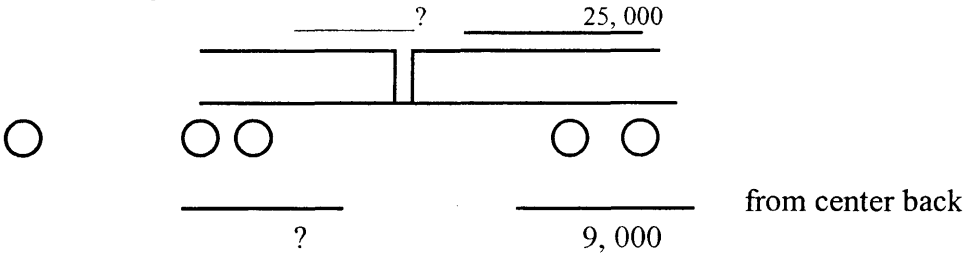
Average Flatbeds weigh **31, 000 to 32,000**
Average Vans weigh **32, 000 to 34,000**

If your tare is 32,000 lbs gross,
and your cargo weighs 48,000 lbs,
then your total gross weight is:_____?

The legal limits for your vehicle are:

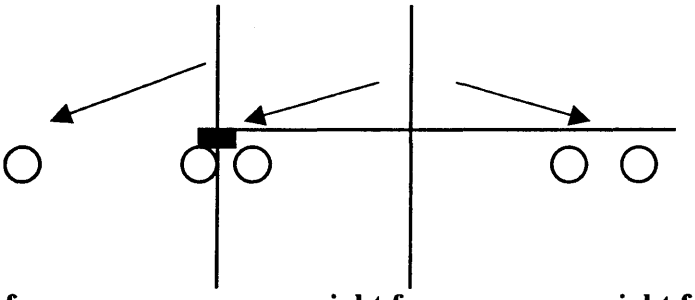


This only talks about gross weight, you also need to know what your empty axle weights are, so that you can decide where to place, or how to distribute the weight, of the cargo on your vehicle.



Note that the weight goes to axles from center of trailer, if your tandem empty weight is 9,000 lbs then you can put 25, 000 lbs of cargo on that set of tandems to equal 34, 000lbs.

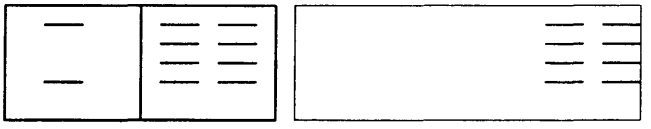
WHERE DOES THE WEIGHT OF THE CARGO FALL?



weight from @ the 5th wheel forward goes to the steers	**weight from @ the center of the trailer forward goes to the drives**	**weight from @ the center to the rear goes on the tandems**

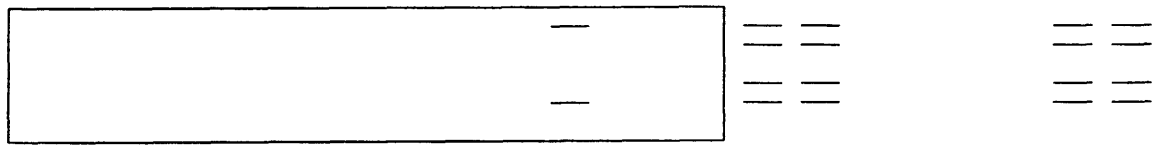
SCALES

There are different types of scales you can way on. The most common nowadays is the gross/axle scales where your steer tires are on one platform, the drives on another and the tandems on a third. This type will give both the axle weights and the gross in one shot.

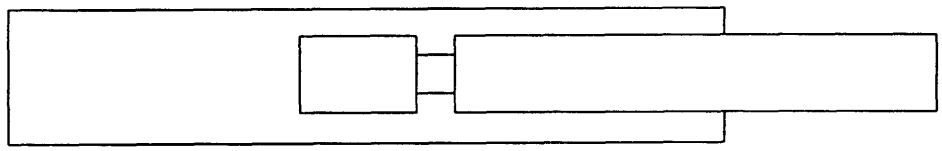


A second type is the full platform scale. Here you have to do some figuring.

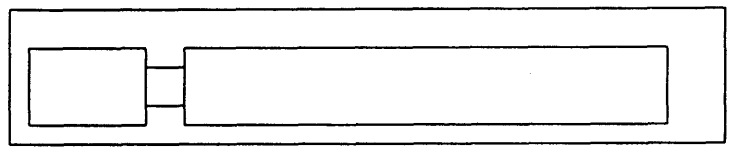
First, drive your steer axle onto the scale. ***Go forward until your drives are NOT quite on the scale.*** **This will give you your steer axle weight**



Then pull your whole tractor on the scale, about up until the middle light on your trailer is on the edge of the scale. This will give you the steers and drives together.



Then pul the whole tractor and trailer on the scale for your gross weight.



You should now have:

STEERS
STEERS AND DRIVES
GROSS

But! What you need is:

STEERS
DRIVES
TANDEMS
GROSS

OK, you've got your Steer axle. To get the drives: subtract the steers from the steers and drives. To get the tandems subtract the steers and drives from the gross.

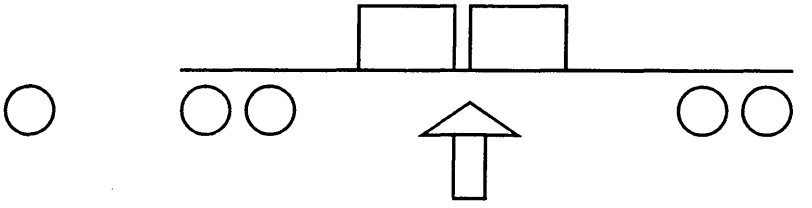
Steers and drives
- Steers
= Drives

Gross
- Steers and drives
= Tandems

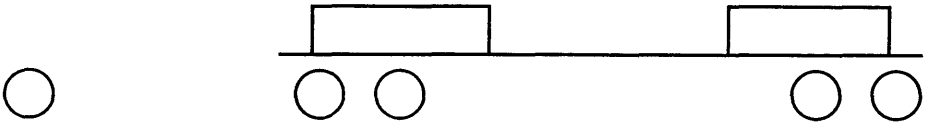
Remember: a gallon of fuel weighs approximately 8 pounds. So, if you fuel up after weighing it can increase your weight by up to 1600 pounds.

Loading from the center

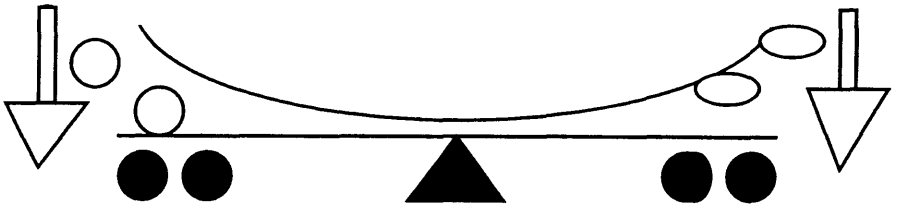
If you load as shown in the next figure, you cannot tell exactly which axle center the weight is going to fall on because the center point of the trailer is an approximation. You have a very hard time controlling whether the cargo weight will be distributed evenly on the drives and on the tandems.



By separating the pieces, the front one about a foot or so in from the front of the trailer and the second piece in about a foot or so from the rear of the trailer. You may leave an empty space in the middle, but you will have control over where the weight falls.



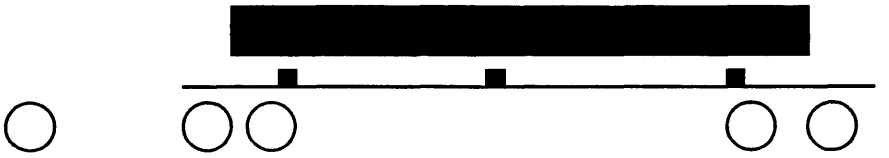
The basic concept is this: What will it take to flatten out the circle over the center of balance?



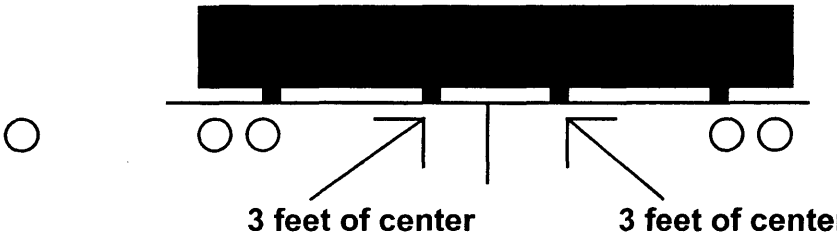
Dunnage - wood (4x4) used to block, brace, or support cargo. It:

- **displaces weight**
- **removes vibration**
- **assists the forklift in getting under pieces of cargo**

Where does center weight fall in the next figure when three 4x4's (dunnage) are used?



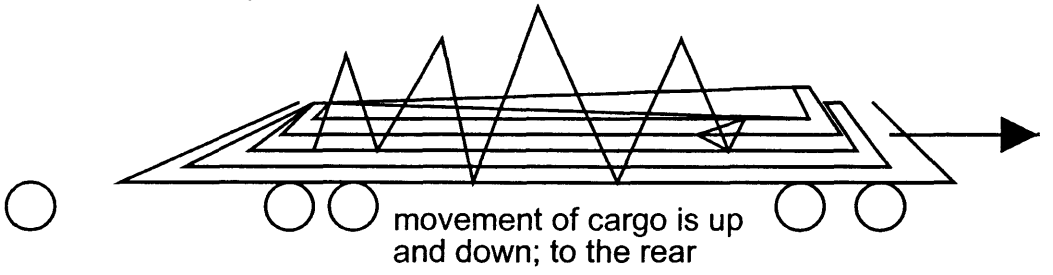
Note that 4 pieces of dunnage are needed for controllable axle weight distribution. see the next figure.



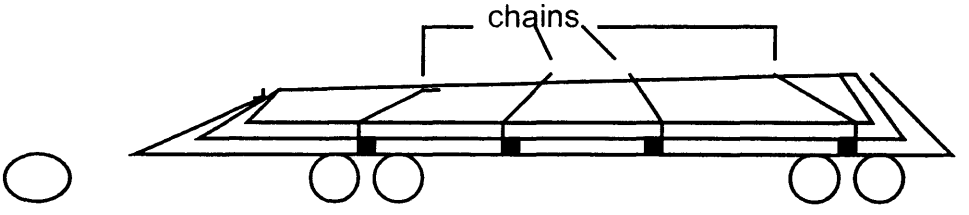
How do you determine where to place the dunnage? Walk out the length of the trailer. If it's 20 paces, then come back 10 paces and that's the center. Throw the weight evenly. Note: count the number of spindles on a side of the trailer against the length of the trailer. How far is it between spindles.

ROAD VIBRATION

Drivers need to be aware that as they move down the road that their cargo is constantly moving. Both side-to-side and back-and-forth.



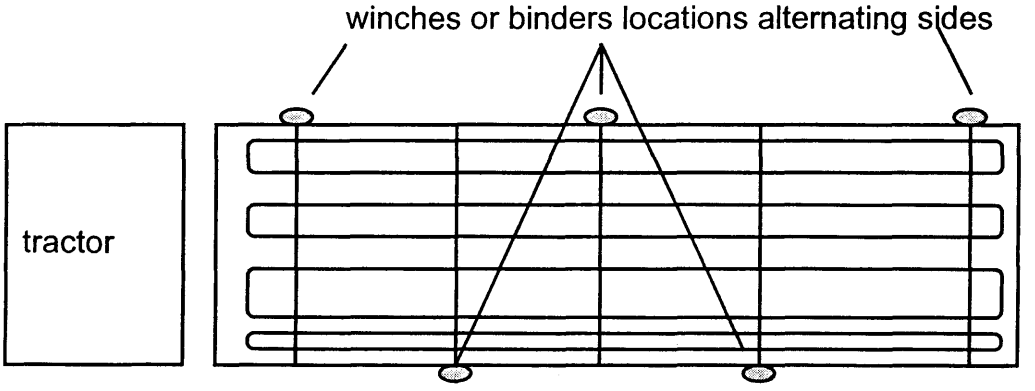
This motion can be controlled or used to your advantage to control your cargo by intelligent placement of your dunnage. Example: plate steel weighing 48,000lbs The tendency is for cargo to move towards the rear. In the next figure placing 4 pieces of dunnage reduces road vibration to 4 points. Chain these points.



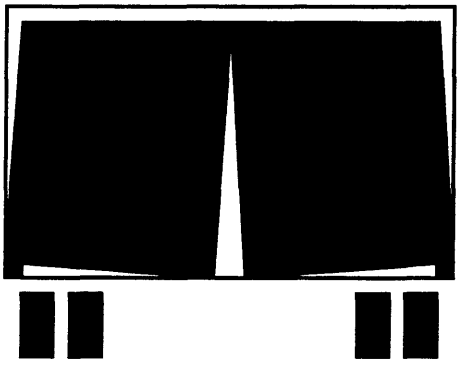
Another example of using dunnage to your advantage is on a lumber load. This load has a natural downslope (angle) to the rear. Put a larger piece of dunnage underneath last edge to prevent the rearward movement. (use 2x4's under lumber put 4x4 under rear bundle)

Always alternate sides with your securement devices when loading.

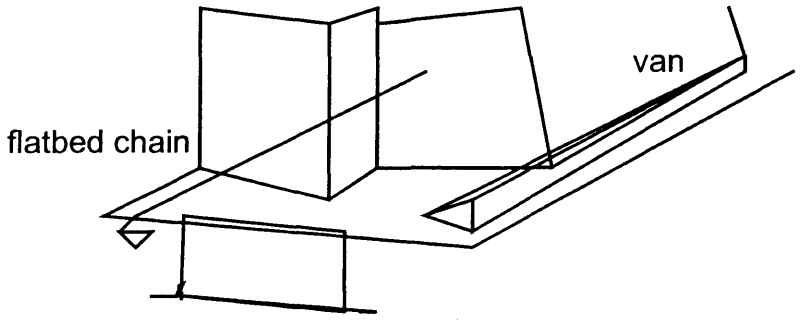
top view of trailer



One of our contracts out of Wyoming is mud (I always wanted to say that). This load is palletized bags of earth or pillow bags. When first loaded and tarped this load looks great. The tarps look sharp-edged and clean. But as you move down the road the edges round off. They are very similar to palletized van loads. See the next figure.



With the road vibration the tendency is for the bags to move to the outside from the top. To compensate for this on a Flatbed run a chain along the outside edge under the pallets. In a van a 1x4 will create the same affect. See the next figure.



Making road vibration work for us by using dunnage correctly. Taking care at the shipper saves time and money on the other end at the delivery to the consignee.

Remember:

Arrow has to run 100 loads for every one claim.

EACH ARROW INSURANCE CLAIM HAS A $25,000 DEDUCTIBLE.

IF YOU HAVE A LOAD PROBLEM .... CALL IN .... YOU CAN REACH THE TRAINING DEPARTMENT AT 1-800-756-3003 EXT 2256.

WEIGH EVERY LOAD

CARGO LOADING PRINCIPLES

There are two (2) basic principles that apply:

- **Do not overload the vehicle.**
- **Distribute the weight properly on the tractor and trailer.**

Avoid overloading The Vehicle. The GVW (Gross Vehicle Weight), the total weight of the vehicle and cargo, should not exceed the limits set by State and Federal Laws.

Axle Weight

Axle weight is the amount of weight transmitted to the ground by one (1) axle or tandem on a tractor or trailer. State laws determine this rating. When driving through a state weigh station, the inspectors will check the GVW and the weight per axle to assure compliance with the legal weight.

Proper Distribution of Weight

The distribution of weight on the tractor and trailer determines the capacity of any of the vehicle's axles. The load should be evenly distributed on the trailer to minimize the need for adjustment of weight after loading the trailer. Remember the key points about loading.

- **Divide the load evenly in the back and front of the trailer. Put roughly half the load up front and half in back.**
- **Spread it evenly on the floor to prevent shifting**
- **Arrange the load to keep axle weight within legal limits. Trailers with sliding tandems: tandems to the rear position puts more weight on the tractor rear axle. Tandems in the forward position puts more weight on the rear of the trailer.**
- **Keep the center of gravity as low as possible. A high center of gravity makes the vehicle more dangerous to handle, especially on curves and hills. Keep it low by**

avoiding concentration of the load on one point of the trailer. Make sure heavy good are on the bottom and distribute partial loads among the axles.

Bridge Law

Federal bridge law provides a standard to control spacing on truck axles crossing highway bridges. The driver must ensure the vehicle meets this standard. There are three (3) ways that the combination of axles must be legal. (See map following)

Distance between front and rear axles of the tractor

This concerns the tractor axles of the tractor determines the maximum weight that the tractor can weigh. On a three (3) axle tractor, the steer axle can only carry 12,000 pounds and the driver axles support 34,000 pounds for a total of 46,000 pounds of loaded tractor weight. In order to carry this much weight legally, the minimum distance between the front and rear most axle of the tractor cannot be less than thirteen and on half (13½) feet

Distance between steer axle and rear most trailer axle

The second group of axles to consider is the distance between the steer axle and the rear most trailer axle. In order to carry 80,000 pounds GVW, the minimum distance cannot be less than fifty one (51) feet between them. Legal GVW declines by five hundred (500) pounds per foot as the measured distance declines.

Distance between forward most drive axle of the tractor and rear most trailer axle

The third group of axles to make legal are the forward most driver axle of the tractor and the rear most trailer axle. The minimum distance necessary to carry 80,000 pounds GVW on a highway bridge is thirty two (32) feet. To determine this value, each set of tandems may carry 34,000 pounds, which totals 68,000 pounds. Look at a bridge law table for four (4) axles, find 68,000 pounds and then read the length required. If the vehicle meets all of the above specifications, it is ready to go to the road. If not, then the driver must adjust the axles, load, of fifth wheel slides to bring the weight into proper legal tolerances.

Transfer weight to the steer axles by sliding the fifth wheel. Each fifth wheel position moves a certain weight between the drivers and the steer axle. This value varies with the style of fifth wheel. To continue the above illustration, say each position transfers five hundred (500) pounds. Move three (3) positions (1500÷500=3) to move 1500 pounds. Unlock the fifth wheel slide lock. Dolly down the trailer. Place the tractor in reverse and back under the trailer three (3) positions. Always lock the trailer brakes during this procedure to prevent rolling.

Transfer weight to trailer tandems by sliding the trailer tandem. Each position on the slider transfers a varying amount of weight. To continue the above illustration, say it transfers five hundred (500) pounds. Move three (3) positions (1500÷500=3) to move 1500 pounds. Lock the fifth wheel slide lock in place. Release the trailer tandem slider lock. Transfer the weight to the rear by moving the slider three (3) holes forward of its present position. Raise the landing gear dolly. SET THE TRAILER BRAKES. Back up to shorten the distance between the tandems by three (3) holes. Lock the slider after adjusting the weight. Return things to normal inside the cab and reweigh the vehicle. Make any other necessary adjustments. State weigh stations use a variety of scales. Drivers must go through a scale if it is open. Many states have empty and loaded lanes. Drive through the appropriate lane and watch the lights when entering the scale. Several states use weigh in motion scales. The driver weighs the unit while moving at a slow speed. The speed will be posted at the scale house weigh lanes. A driver must not speed or stop unless given the "red light." The driver will then stop and await further directions. Some use split drive axle scales. There is a center line on each scale. Position the drivers, one on each scale, and stop. If the weight is correct, the driver will get a green light unless they want further information or see a safety

violation on the unit. There are serious consequences to overloading, including fines and safety problems .

FUEL MANAGEMENT

Diesel fuel weighs approximately eight (8) pounds per gallon. Trucks carry an average of two hundred (200) gallons full fuel capacity. The weight of the fuel would be sixteen hundred (1600) pounds. The driver must allow for the weight of the fuel when making the tractor/trailer unit weight legal. A driver may carry additional weight at the expense of fuel capacity. Two hundred (200) gallons with an average of six (6) miles per gallon would give the driver a range of twelve hundred (1200) miles before refueling. Seventy two (72) gallons with the same six (6) miles per gallon would give the driver a total range of 432 miles. This is a major consideration when approaching the 80,000 pound GVW.

PERSONAL INJURIES

The main driver injuries come from three things:

- **falling/jumping from the trailer and/or load,**
- **getting smacked by the winch bar and/or bungees (and other equipment), and**
- **improper lifting of cargo and tarps.**

These injuries happen on both the flatbed side of the company and the Van side.

Injuries around the tractor

The simplest motions that we make every day result in injuries when we don't think. Many of our recent driver injuries have happened to both experienced and new drivers and as the experienced drivers have said, "I knew better...I should have....I just wasn't paying attention".

One motion that results in broken bones, back injuries, and recently head injuries is simply getting out of the tractor. How many times have you parked the truck, turned it off, opened the door and stepped out onto the step instead of turning around and climbing down the steps? You do it every day. This can kill you.

Your foot slips as you descend to the bottom step, a rock turns under your foot when you step to the ground, and your in the hospital losing time, money, and possibly ending your career. *Always use the 3 point stance getting up into and down out of the cab.*

There is an even simpler way to think of this: *Every time your feet leave the ground you are putting yourself at risk!* We climb up onto the tractor at the driver's door, to clean windshields and mirrors, to access our equipment behind the tractor, to access the front of a trailer often handling equipment at the same time. We step on the steps, the catwalk, the frame, and even the tires. We need to make sure that:

- **the areas we are going to step on are clear of ice, snow, equipment, and slick substances.**
- **use a 3 point hold or stance whenever climbing up or down from the vehicle.**
- **we don't allow ourselves to get hurried. Save the speed for the open road.**
- **ask ourselves where we can get hurt. Think of yourself as a 90 year old man with a walker, asking yourself where is this going to hurt you.**

Connecting, or disconnecting, your airlines and pigtail is a situation that can present its own dangers. When connecting the lines, start with the one furthest away from you and work towards you. Never stand over the lines where, if they pop loose, they can fly up and damage parts of your anatomy. This is even more important when disconnecting the lines. Start with the one closest to you and work line by line away from you. *Do not position yourself where you will get your feet tangled in the lines when connecting/disconnecting the lines or when getting gear off of the headache rack.*

Injuries around the trailer

We can access the trailer from two points, the front and the rear. Jumping down from the trailer will ruin your knees. Again, with something turning under your feet you have the potential for broken ankles. In winter conditions, give the same attention to the DOT bumper that you give to clearing off your steps to the tractor.

If running vans, be extremely careful when opening trailer doors. Doors can swing violently in strong winds catching you by surprise. Improperly secured cargo can topple over against doors causing the doors to swing violently when you try to open them. Do not try to catch falling cargo! When you position yourself to open a door make sure that your feet are set so that you step away from the swing of the door, not with it.

Injuries with cargo

Lifting cargo, falling off loads already on the trailer contribute to some of the most severe injuries driver fall victim to. When lifting do not bend over, squat down and lift with your legs. Know the weight of what you are trying to lift and do not turn and twist while holding something heavy. Hold things close to the body instead of at the full reach of your arms.

When on top of loads be careful of your footing, especially when tarping a load. Always unroll a tarp away from you. Do not walk backwards to unroll it.

Injuries with equipment

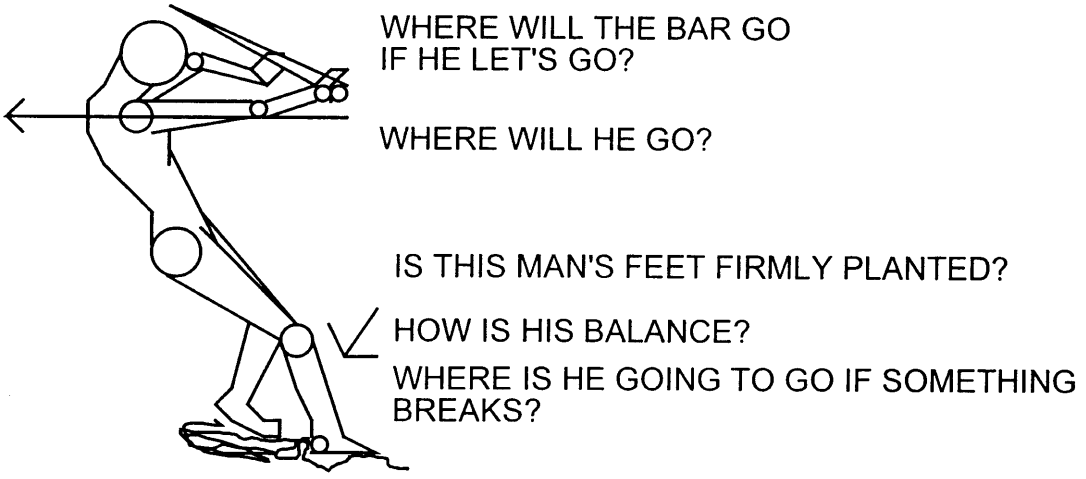
Let's take a look at the other cause of injuries mishandling the winch bar when tightening or releasing the binders and winches.

The winch bar can be several useful things to a driver. It can also be a deadly weapon, an unguided missile, a bone-breaker, a jaw breaker, a face smasher, a finger cutter, a back breaker. Keeping a few common sense rules in mind can keep the cheater bar working for you instead of endangering you.

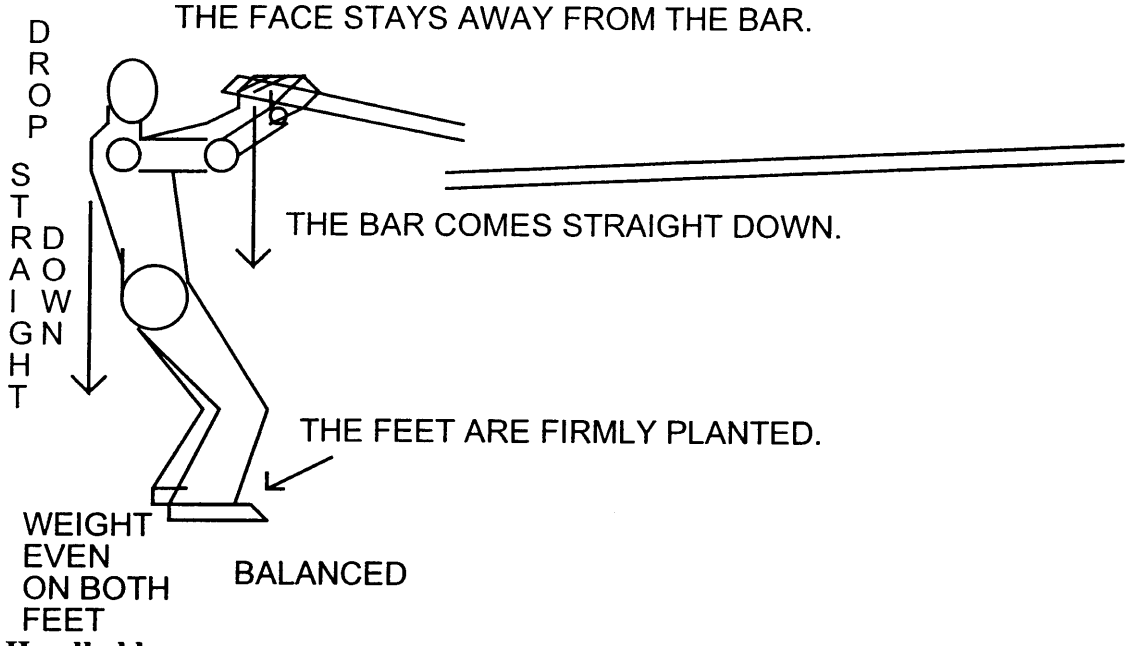
Stance

How you stand, What you stand on, Where the bar is going to go in relation to your body, all go in to determining your stance when tightening, or releasing, the securement devices. The constants that are important are:

- Keep you feet firmly planted.
- Keep your weight balanced evenly on both feet.
- Keep your face out of the way of the bar.

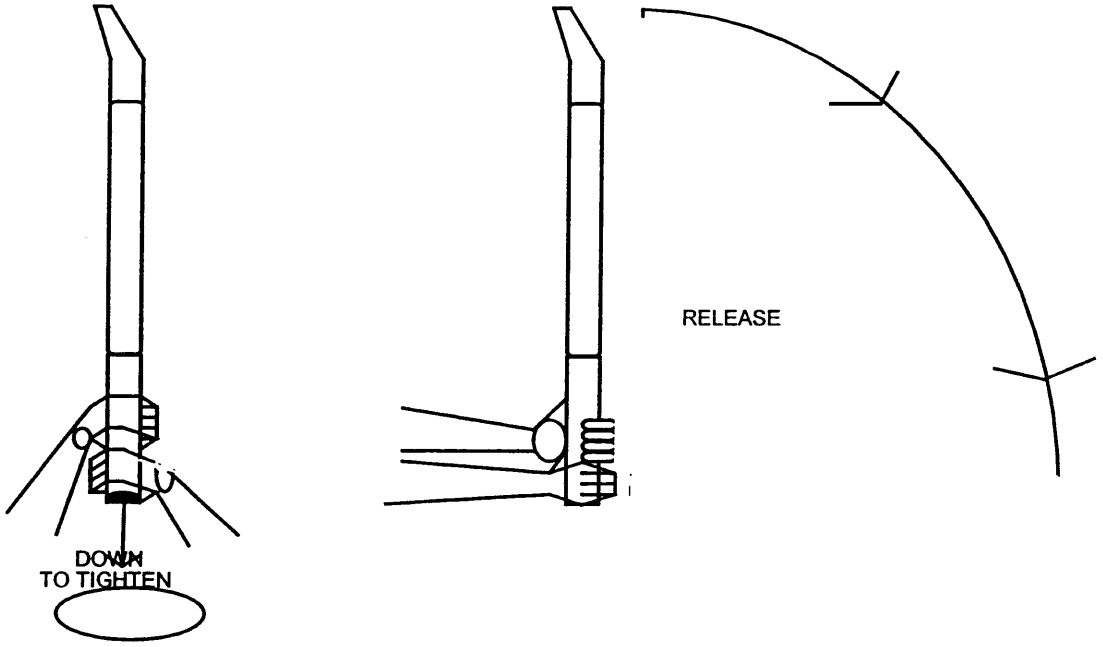


We need to think of these factors every time we handle a winch bar. We need to think of the risk to ourselves and others in the area. A winch bar can be thrown by the sudden release of tension in an opening binder. It can be thrown 30 to 40 feet with terrific force. Imagine that force hitting you in the face. Imagine that winch bar flying off and hitting someone else, or your cargo.



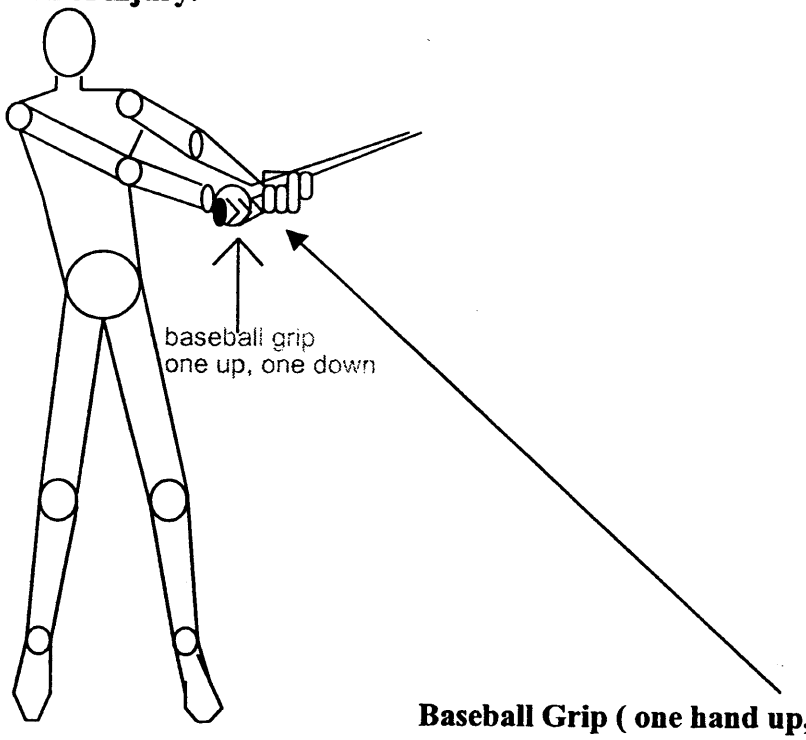
Handhold

How you grip the winch bar can impact internal body injuries such as tearing a muscle, damaging a shoulder joint (shoulder rotator cuff), or being stabbed/smacked by the bar. When tightening or releasing a binder on a chain, or a winch on a strap, hold the cheater bar the way you would grip a baseball bat (see the below figures). This allows you a firm grip and takes into consideration our other points of stance and body motion.

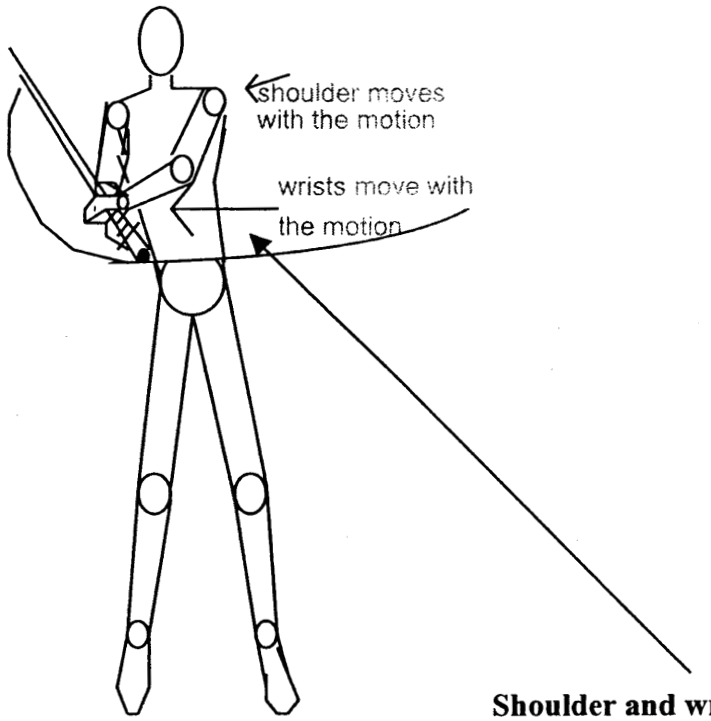


Body motions - working with the tool.

Which way will the bar swing with the tightening and the release of different securement devices? Your stance and your handhold determine how your body is going to move either with the movement of the bar or against it. Your body motion with the movement of the bar can cause injuries, or, if we're smart, minimize the risk of injury.



Baseball Grip (one hand up, one hand down)



Shoulder and wrists move with the motion!

With both hands grabbing the bar in the same direction there is the possibility of injury to the rotator cuff of the shoulder.